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TABLE OF CONTENTS, PAGE II

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Veterinary Inspection of Meat, Meat Foods and Dairy Products Consumed by the Army*

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THE VETERINARY CORPS of the Army of the United States is an integral part of the Medical Department. It performs two important services: First, it maintains the health and efficiency of the public animals and second, it conducts inspections of meat, meat foods and dairy products to be consumed by the Army personnel. The fact that the Army has become highly mechanized has considerably reduced the animal strength, and makes the inspections of food products the chief duty of the Army veterinarian. It has been demonstrated that the officers of the Veterinary Corps are especially well qualified to do this inspection work. Their knowledge of animals, animal diseases, pathology, histology and chemistry has given them sufficient basic education to readily grasp the technic of inspection work. This inspection should and must be confined to the Veterinary Corps and not be delegated to any other agency. Experience with laymen substantiates this claim.

Food for the American soldier is carefully purchased. There are certain specifications for each item on the menu, and there are specially trained people to see that the specifications are carried out. Since the Veterinary Corps deals with fresh meat, meat products and dairy products, these are the items I shall discuss.

The initial step in the purchase of an item is taken by the purchasing quartermaster. He notifies the dealers that the Government wishes to buy a stated amount of a certain product, to be prepared according to a certain specification, which is quoted. This invitation to bid also indicates the grade, quality, size and weight of the item to be purchased. These invitations are sent only to those packing plants operated under the supervision of the U. S. Bureau of Animal Industry. On a certain date, representatives of the houses which have decided to bid gather at a designated place at the Quartermaster Depot, and the bids are publicly opened and considered. The contract is awarded to the firm which makes the lowest bid. The successful bidder then receives a purchase order which sets the time of delivery. It also states, in the event of a meat, meat food or dairy product, that inspection will be conducted under the supervision of a veterinary officer.

The carcasses going into meat products must bear the stamp of approval of the Bureau of Animal Industry. It is not the purpose of the Veterinary Corps to duplicate any inspections made by the Bureau of Animal Industry. Our inspection work begins after their approval has been indi-

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cated. The Army veterinary inspection really begins in the chill room where the meat is offered for sale. The meat is first of all graded in accordance with the specifications of the product to be manufactured. In the event beef is used, the grade selected is either *canner* or *cutter*. Similar standards exist for meats other than beef. It is very important that this initial step of grading the meat is properly conducted in order that a satisfactory finished product will be obtained. Frozen meat as well as chilled meat is inspected for processing.

After the graded and selected carcasses leave the chill room and pass through the cooking, pickling and trimming processes, the canning process begins. This method of preserving food is important in the problem of food supply for the Army. Considering the large number of troops scattered over this vast land of varied climates, one can realize that if there were not some way of preserving food so that it would be pure and wholesome, regardless of the distance it travels and the climates it passes through, the efficiency of the Army would be greatly curtailed.

CANNING OF MILITARY ORIGIN

The canning industry had its beginning in France the early part of the nineteenth century. The Army of that country was instrumental in its coming into being. The French government was anxious to have some means at its disposal to satisfactorily preserve food for soldiers. It had been demonstrated in earlier years by an Italian priest-scientist that bacteria do not develop in vegetable infusions which have been boiled and placed in hermetically sealed glass tubes. Working on this theory a Frenchman, Nicolas Appert, in 1802, introduced a practical method of preserving food for military stores by the use of air-tight glass containers.

Since that time, the canning industry has steadily progressed, and we are informed by the canning experts that still more can be expected in the rapidity of production and quality of the product. Today, 20,000 to 160,000 cans of a product can be processed in one day in a single plant, depending upon the size of the can and the product involved. There are still many problems confronting us in the production of canned food, but in use the advantages far outweigh the disadvantages. Shipping is greatly simplified, as to space required and distance. Also, the troops are assured of a varied diet of good, pure food that was carefully supervised when prepared.

THE ARMY'S SUPERVISION

The supervision of the processing is conducted at the packing plant by a veterinary officer and his detail who, of course, have the federal specification before them at all times. The canned products most widely used are corned beef, corned beef hash, dried beef, bacon, ham, and a variety of sausages. There are others, of course, but those mentioned are the ones produced in the largest quantities. The first operation which receives the veterinary inspector's attention is the percentage and quality of ingredients going into the can. For example, in corned beef hash, 46 per cent of the contents of the can is composed of potatoes, 51 per cent beef, and 3 per cent onions. Vienna sausage is made up of approximately 50 per cent beef and 50 per cent pork. It is the veterinary officer's duty to see that all ingredients are handled and processed in a sanitary manner.

After the product to be canned is prepared, a vacuum is drawn before processing by either the exhaust system or a mechanical vacuum. The method used depends upon the contents. The degree of processing varies with the product. It usually ranges from an hour and a half to four hours with the heat varying up to 240 F. During the process, extreme caution must be exercised to prevent overstretched tins which will later become confused with either a lack of vacuum or create what is termed a "flipper". These conditions are most likely to occur during the cooling process. Lack of vacuum will produce discoloration of the product and might cause bacteria to multiply and cause spoilage. Other defects to watch for are *leakers*, *swellers* and *springers*. The veterinary officer must be thoroughly aware of all hazards and guard against them.

After cooling of the cans, they are passed

through a hot-water bath to remove all grease and dirt before being lacquered. Lacquering is also carefully supervised to insure the use of a good quality lacquer evenly applied. This is necessary in order that the can will be protected against rust. When the lacquering process is completed, the cans are placed on a table in a room with a temperature from 85 to 100 F. where they are held for a period of not less than 72 hours. This is done to permit any latent defects to develop in the cans before being passed for shipment. Experience indicates that a 72-hour waiting period is sufficient time for *leakers, swellers* and *springers* to develop. During the processing of the can, the temperature of the contents can be ascertained by the method known as heat penetration. This is accomplished by the use of a thermocouple, stuffing box, and a potentiometer. This indicates to a fraction of a degree the internal temperature of the can. The temperature can be raised to any desired degree and thus eliminate any guess work as to the heat necessary to kill all bacteria.

New Problems Arise

Recently, the Veterinary Corps has been confronted with new problems in regard to the preparation of frozen boneless beef, defense hams and defense bacon. By adopting the use of frozen boneless beef, shipping problems have been minimized as the product does not require nearly as much space as carcass beef since fat, tendons, bones and other waste materials are absent. It is also more desirable, due to the fact that an organization can more readily obtain the cuts desired.

The boning procedure is carefully supervised according to specifications by veterinary officers. Grade B Medium Beef is selected, which is comparable to the BAI market service of "low," "good," or "top medium." Until recently, steer carcasses only were accepted by the Army, but due to the huge quantities that are being purchased during the present emergency, these standards have been lowered, and heifers and some cows are acceptable.

After selection of carcasses on the rail, either steer or heifer, they are taken into the boning room, quartered and cut, and boned in the presence of a veterinary officer and his detail. The meat is then wrapped and packed in a box with weight and the classification indicated. It is then immediately placed in a sharp freezer with the temperature ranging from —17 to —22 F. It is frozen solid; no shipments are permitted to leave the plant if the meat does not show this frozen condition. The meat is shipped in refrigerator cars. This type of beef will be shipped to various warehouses throughout the country where it will be stored until needed by troops in that section. Boneless beef will probably replace shipments of carcass beef in most instances. Our veterinary officers in Chicago have been working on large contracts for boneless beef during the last two or three months.

Defense bacon, as the name implies, is a type of bacon recently developed in connection with the defense program. It is not by any means a compromise in quality with the type of bacon usually prepared for the Army, but rather an attempt to make an even better product. The defense bacon is given a special curing process, then packed in rectangular boxes and cured in its own pickle. This special cure consists of 4 lb. of fine salt, 1½ lb. of granulated sugar, 3 oz. of nitrate of soda and ¼ oz. of sodium nitrite. The ¼ oz. of sodium nitrite may be replaced with 1 oz. of sodium nitrate, if desired. These ingredients are for 100 lb. of bacon. The curing process takes two to three days per pound of the weight of the green bellies. We have had practically no difficulty with the production of defense bacon, and there is every reason to believe we will have a very satisfactory product.

The production of defense hams, however, is not progressing as smoothly as the production of defense bacon. Defense ham is an artery pumped ham not to exceed 8 per cent of weight of 100 per cent pickle, followed by a cover pickle of not less than 80 degrees salometer strength. These hams are then taken from the salometer strength pickle, placed on drain racks for a four-day draining period, and smoked for 48 hours at a 122-degree internal temperature. The difficulty we have encountered is in regard

to the smoke period. We have reports from stations which have received these hams stating that they are too moist and mould has formed. Accordingly, our office has been experimenting, and we have found what we believe is a solution to the problem. By increasing the smoke period from 48 to 72 hours, and bulking in salt for 48 hours, we think the hams will be sufficiently dried out so that they will remain in good condition under most circumstances. We have obtained authority to prepare some hams according to the new method, and if they are successful, there is every reason to believe that the federal specifications will be changed in accordance with the findings of the Veterinary Corps.

In Chicago, we do not conduct many inspections of dairy products. We inspect a few samples from shipments sent into the depot before the shipments are accepted. We also inspect samples sent in from stations located nearby before acceptance of shipments at destination. Our work deals principally with meat products, fresh and canned; however, each officer is trained to make inspections of milk, butter and cheese. Then, too, we are often called upon to inspect establishments producing dairy products.

In closing, I would like to make a few remarks on a new project in connection with veterinary inspections. It was discovered that a great deal of confusion and ill feeling might develop if some standardized system of inspection was not instituted among the inspectors located in various stations throughout the United States. Accordingly, last November [1940] the School of Meat and Dairy Hygiene for Veterinary Officers was established at the Chicago Quartermaster Depot. The purpose of this school is to teach all the officers a standard method of inspection which will insure the consumption of good food of uniform quality throughout the Army. Each class is made up of approximately 20 officers from all parts of the country. The officers are selected by the Corps Area veterinarians, subject to the approval of the Surgeon General of the United States Army. The course of instruction is complete, and the packing houses of Chicago have generously coöperated by granting permission to use plant facilities, thus affording the students practical experience. Each class is in session about a month, and one group follows another with just a few days intervening. At this rate it will probably require two to three years to train all veterinary officers. The school has functioned satisfactorily.

The Farm Animals of the United States

KIND	1940		1941		CHANGE	
	NUMBER	$-VALUE	NUMBER	$-VALUE	M-$	NUMBER
Horses	10,214,000	697,352,000	9,856,000	638,757,000	— 58,595	— 358,000
Mules	3,922,000	420,469,000	3,811,000	409,742,000	— 10,757	— 111,000
Cattle*	71,461,000	3,901,259,000	74,607,000	4,113,148,000	+ 211,887	+ 3,146,000
Dairy Stock	25,478,000	1,551,679,000	26,303,000	2,901,000,000	+1,349,321	+ 825,000
Sheep	54,283,000	365,496,000	55,979,000	482,280,000	+ 116,784	+ 1,696,000
Hogs	54,256,000	452,586,000	60,526,000	946,608,000	+ 494,022	+ 6,270,000
Chickens	422,909,000	276,427,000	473,933,000	394,159,000	+ 117,732	+51,024,000
Turkeys	7,252,000	15,411,000	7,710,000	23,717,000	+ 7,306	+ 485,000

*Includes dairy cattle.

Livestock Transportation*

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ONE OF MAN'S most important problems has always been the quest for food. How to outrun his game, catch it, and carry it back to his family was one of the most important occupations of primitive man. And modern man spends most of his working day in some employment, the earnings of which can be used to buy food for his family.

From this fundamental necessity for sustenance and good health has been developed a livestock and meat industry in this country which dependably provides meat for the entire nation, and also a surplus for other countries.

The development of few industries has furnished as much romance and drama as that of meat and livestock. To appreciate this, one has but to read, for example, how cattle crossed the North Atlantic with the Norsemen nearly a thousand years ago; how cattle, hogs, and sheep landed with Columbus among the natives of the Caribbean. And there is the story of how a herd of hogs wandered a thousand miles with De Soto's army, from the swamps of Florida to the bayous of Arkansas. Even the original Uncle Sam is credited with having been a meat packer in Troy, New York, who furnished meat for our army during the War of 1812.

"THE DROVERS" AND THEIR SUCCESSORS

Nearly one whole generation of Americans saw long lines of livestock trudging from Ohio Valley farms over the Allegheny Mountains to eastern seaboard slaughterers. Associated with this phase of the history of our country are countless tales of the interesting experiences of those drovers. It is possible that there might never have been a livestock market at Pittsburgh had not this become a meeting place early in the nineteenth century, where eastern packer representatives frequently intercepted drovers as they were trekking their animals to the seaboard for sale and slaughter.

Still another generation witnessed the overland drives across the endless plains of Texas, Oklahoma, and Kansas before railroads were built through that territory. Certainly nothing has proved more interesting than the stories of the Chisolm Trail.

Today, the production, transporting and processing of livestock and the distribution of meat and other animal products comprise one of the nation's major industries.

AMERICAN FARMS: THEIR LIVESTOCK AND THEIR TRANSPORTATION

Nearly three-fourths of the agricultural land of the United States, and a great majority of our farmers, are partly or wholly engaged in producing and feeding livestock. Cattle are produced on approximately 5½ million American farms and hogs are found on approximately 4 million farms. Nearly a million farms and ranches produce sheep.

Last year [1940] there were slaughtered under federal inspection in this country 9,756,000 cattle, 50,398,000 hogs, 17,351,000 sheep and 5,359,000 calves. Needless to say, all of this vast production of animals would have been practically worthless had there not been quick, efficient and economical services available for transporting them to a point where there was a demand at a cash price.

Thus, we see that transportation provides probably the most important single service in making possible a large-scale production of livestock for processing into meat. It serves the producer, whether his needs be for movement of animals from the range to the Corn Belt feedlot, or from the farms and feedlots to the packer. It

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serves the city man by making available to him a supply of meat 365 days in the year.

The first shipment of cattle by rail was in 1852 when a herd of 100 head were moved from Lexington, Kentucky, to New York, after they had been driven overland to Cincinnati. This required about a week. At Cincinnati, the cattle were loaded in box cars and shipped to Cleveland where they were transferred to a steam-boat on Lake Erie and sent to Buffalo. After several days' rest at Buffalo, they were driven on foot to Canandaigua, N. Y., from where they were hauled in immigrant cars to Albany. Here they were unloaded, and after two days' rest in a feed yard, were taken by steamboat down the Hudson River to New York City. The cattle were en route the better part of a month.

The first time a special stock car was used to transport livestock was in 1854. A wooden fence was built around a flat car, and after considerable difficulty a shipment of cattle was loaded into this at Latrobe, Pa., and hauled to Philadelphia. Thereafter, improvements came rapidly. Stock cars were roofed, and in 1860, the first double-decked car was put into use for small animals. Today, railroads have fleets of stock cars of standard dimensions, constructed under specifications for safety and comfort of animals in transit.

In addition to standardized equipment, railroads have provided special expedited service to take care of the particular needs of livestock. Probably no other commodity is more perishable, and rail carriers have met this with regular livestock trains scheduled to provide the quickest possible delivery. Today, instead of its taking approximately a month to move a shipment of cattle from Lexington, Kentucky, to New York, it takes only two days and nights, the animals arriving there the second night, ready for slaughter on the third morning. From Denver to Chicago, livestock trains are scheduled to make the 1,100 miles safely in approximately 32 hours. Schedules for trains between all other major points where there is a regular movement of livestock have been worked out with a corresponding understanding of the importance of speed and safety.

Hygienic Handling of Livestock Instituted

While transportation services have developed to enable a wider distribution, or movement, of livestock, it has not been without the creation of additional problems. When livestock is moved from place to place, serious losses may be inflicted by inhumane treatment. Furthermore, it is true that unless properly regulated and policed by authorities trained for that purpose, the movement of livestock from one area to another presents a hazard, namely the spread of costly communicable and infectious diseases.

Taking cognizance of these facts, legislative authorities as far back as 1884 enacted federal laws conferring upon the United States Secretary of Agriculture certain powers to regulate the manner of delivery and shipment of livestock moving interstate. From these early acts and those subsequent thereto, have come our present day regulations governing interstate movements of livestock.

Almost simultaneously with the development of these interstate regulations came individual state regulations governing the handling of livestock intrastate. All of these regulations were promulgated in the interest of preventing in so far as possible, the spread of such diseases as tuberculosis, hog cholera, foot-and-mouth disease, scabies, anthrax, brucellosis, etc.

About 35 years ago, Congress enacted the 28-hour law which, with its later amendment, prescribes the maximum length of time livestock in interstate movement can be confined in railroad cars without being unloaded for feed, water and rest. Handling animals in conformity with the provisions of this law is a humane act, and prevents undue shrinkage in weight. Thus, the animals are now delivered at their destination in the best condition possible.

The Uniform Contract

As a result of these regulations as well as certain requirements for uniformity im-

posed by the Interstate Commerce Commission, rail carriers have a system for handling livestock shipments with which every stockman should be familiar.

First, when making a shipment, the shipper must sign a uniform livestock contract. In addition to stating the terms under which the carrier accepts the shipment, information is required as to description and number of animals in the shipment, origin, shipper's name, consignee, destination, and route over which shipment is to travel. One copy of this contract is retained by the railroad, and the original is given to the shipper. Quite often the shipper may request an additional copy to be mailed to the consignee. Such an initial record is a protective measure that benefits both shipper and railroad.

Then, if shipper prefers to execute the 36-hour release, he can sign another form presented by the carrier's agent authorizing carrier to extend time of confinement in cars without unloading for feed, water, and rest, to 36 hours instead of 28. This is the maximum limit that animals can be confined in cars, as provided by law.

Health Certificates and Loss Prevention

Finally, shipper must present health certificates or other affidavits, if required, before animals in question may be accepted by the railroad.

Before the shipment is forwarded, a waybill is prepared by the local freight agent which must accompany the car to final destination in the possession of each train conductor on duty en route. Each waybill is assigned a number, and on the face of it is shown the car number, shipper's name, origin, consignee, destination, route, time loaded, whether or not 36-hour release was signed, size of car ordered, size furnished, rate per cwt., species and number of animals, weight of animals, etc.

If government certificates are required, these must accompany the waybill, and notation of same must show on waybill. If animals are unloaded for feed, water, and rest en route, the waybill must be stamped at the feeding point. It must show time unloaded, time reloaded, amount of feed furnished and charges for same. Removal of dead or crippled animals en route must also be noted on the waybill. In other words, a complete history of each car's movement is recorded by the time car reaches destination, where a final notation is placed on the waybill showing time of delivery and unloading. This "case-history", if you prefer to call it that, becomes then a permanent record. Such a system has been of inestimable assistance to federal and state authorities charged with the duty of policing livestock movements, both inter- and intrastate.

In addition to these provisions required by law, railroads have voluntarily done a great deal of educational work directed toward further reducing losses from crippling, bruising and death of animals occurring en route. Recommendations have been made as to what constitutes a safe number of animals to load. The railroads are continually coöperating with livestock markets, packers, the National Livestock Loss Prevention Board, humane societies, and all other agencies interested in reducing controllable losses of livestock in transit to a minimum.

Truck Transport and Buying Stations

The general subject of "Livestock Transportation" can not be disposed of without referring to the development of motor-truck transportation during the last 15 to 20 years. Many things have transpired to change livestock transportation needs during this period. For example, direct marketing has grown in opposition to the old and well-established system of selling and buying at public livestock markets. Country buying stations and livestock auction markets dot the countryside. In many instances these new systems of marketing have placed outlets for livestock closer to the farm or ranch. Then there has been the advent of good roads. These and other changes have contributed greatly to the use of trucks for hauling livestock, both farmer-owned trucks and those for hire. Several million head of stock are hauled over the highways to markets annually, as well as from grazing areas, or intermediate

feeding points to farm lots.

According to the United States Bureau of Agricultural Economics, 13 out of every 100 loaded trucks on the highways are hauling either animals or their products. Thus today there is a dual system of transportation—rail and truck—serving the livestock industry.

Transportation agencies are of vital necessity to the livestock and meat industry. Their service is of utmost importance if the industry is to continue on the present scale of production. As transportation needs change, their services must be adapted to the changing conditions.

The railroads are fully aware of the dependence the livestock industry has placed in them. A keen appreciation of this fact can not be evidenced better than by citing a few examples of advancements made in recent years. Many railroads have established any-quantity rates, affording shippers the advantage of carload rates on less than carload shipments. Other lines have experimented with a local pick-up service from farm to the railroad loading pens. Tariff provisions are constantly undergoing changes in the interest of making rail transportation better adapted to present day needs. All lines are constantly studying ways in which their equipment and methods of handling can be further improved. And innumerable other advancements, though maybe not of a spectacular nature, are evidences of the rail carriers' efforts to serve the stockmen and packers adequately, efficiently and economically.

As our forefathers blazed a trail for supplying this country with meat, it is the heritage of all of us associated with either the breeding, feeding, marketing, transporting, or processing of meat animals, to see that this business progresses for generations to come. That this is of public interest is evidenced by a recent Gallup poll. Low-income people were asked, "What would you buy first if you had an increased income?" Thirty-seven per cent of the answers listed meat as first choice.

DISCUSSION BY WILL J. MILLER*

I am heartily in accord with Mr. East's method of furnishing shipping records and health certificates on interstate shipments of livestock for other than slaughter purposes. Of course such legislation should not apply to regular farmer-owned, market-bound shipments.

This group of state regulatory officials is primarily interested in controlling the spread and eradication of livestock diseases. We may continue to expect more disease leaks until every lot of livestock coming into our states is accompanied by a proper health certificate and a shipping record. Outbreaks of disease from "bootleg" shipments are old stories to most of us.

As livestock regulatory officials we are not concerned with the methods by which livestock is transported into our states. But we are vitally interested in knowing what comes into our states, the points of origin, the method of handling in transit, and whether or not a health certificate has accompanied the shipment. We are primarily interested in permitting the entry of healthy animals only, so that our livestock growers may be protected against losses in their feeding and breeding operations.

Under present conditions federal officials are limited in the help they can give individual states in the inspection of shipping records and the regulation of all interstate shipments of livestock. Although some transportation agencies apparently honor or are more reluctant to violate federal regulations, we are continuing to have an increasing number of shipments of livestock moved interstate for feeding and breeding purposes without proper inspection and certification.

UNIFORM HANDLING POLICIES NEEDED

In his 1939 report to the Secretary of Agriculture Dr. John R. Mohler, chief of the Bureau of Animal Industry, has summarized some of the methods in which disease leaks have occurred in interstate shipments of livestock, under the heading of an article, "Livestock Trucking in Relation to Disease." Doctor Mohler has stated that "new problems have arisen, caused principally by the great increase in livestock marketing by motor truck."

He states that formerly a comparatively large number of livestock passed through the principal markets where federal BAI inspection is maintained, but that now, as Mr. East has stated, approximately 50 per cent are so marketed that federal inspection does not obtain. One phase of inspection of much value to the livestock industry is that the Bureau determines the origin of diseased animals and reports the same to state and federal regulatory officials. Naturally, this type of service has decreased in volume proportionately.

The BAI in its supervision of cleaning and disinfecting cars, trucks, and premises which have contained diseased animals is an important factor in the control and eradication of disease. The report states that "the type of supervision described has been greatly com-

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plicated, however, with the advent of the motor truck as a principal livestock carrier." He states that the mobility of the truck makes it possible to deliver diseased animals and livestock before the infection is discovered, and that the infected truck may be used again before it can be traced and disinfected.

The 28-hour law, combined with the necessary shipping records, has been a great benefit to the livestock industry in general. Dr. Mohler states that "efforts are being made to have the present law amended so that it will cover truck as well as railroad shipments of livestock."

Shipping Records Needed

Mr. East has so well stated in his paper that rail shipments must pass through prescribed stations and furnish a waybill, giving the history of each shipment. Such shipments are much easier to inspect and regulate than shipments coming in other ways, principally because the railroads are required to furnish shipping records and health certificates in accordance with state and federal regulations.

Each state regulatory official should receive a shipping record on all inbound interstate shipments except on farmer-owned, market-bound livestock, including the following data:

(1) At present many interstate rail shipments are stopped at federally inspected markets to receive free inspection and health certificates.
(2) Shipping records, showing methods of transportation.
(3) License number and size of car or truck.
(4) Number, weight, brands, breed, and whether for slaughter, feeding, or breeding purposes.
(5) Name and address of shipper and consignee.
(6) Route taken in transit.
(7) Feeding and rest record to include place, pen number, unloading and reloading records, including dates, time, and count, deads or cripples removed, and the amount, kind, and price of feed fed.
(8) Kind of bedding used.
(9) Records of transfer to different vehicles while enroute.

Enforcing Regulations

At present few states have adequate police authority to cope singly with interstate shipping violations. A comparatively small number of states have done much to protect the health of their livestock by authorizing peace officers and highway patrols to examine shipping records and health certificates of shipments entering their borders.

Apparently interstate shipments moved from country point to country point with bill of lading or proper shipping records, and which do not stop at a federally inspected market, find little interference because state regulatory officials do not have any means of knowing about these "bootleg" shipments. Even though state and federal officials may not be able to stop and inspect shipping records on every interstate shipment, the psychological effect of enforcing regulations on a few violators in various parts of the states will have a wholesome effect toward compliance with state and federal regulations in moving livestock interstate. Most illegal movements would cease when transportation agencies know that some regular inspection system is maintained on the highways and at ports of entry.

How to Get the Job Done

Every regulatory official knows his limitations in attempting to control the many types and kinds of livestock shipments coming into his state. Every one of us, I believe, realizes the added assistance and help which would come from federal regulations requiring that adequate shipping records accompany each shipment of livestock coming into the state that is not consigned to a public market where federal BAI inspection is maintained.

We can not secure this federal coöperation by wishful waiting and by doing nothing but grumbling about the present situation. But we regulatory officials can help our own livestock growers by telling our congressmen back home the real need of amending the 28-36-hour law, so that it will cover all shipments of livestock coming into our states for feeding or breeding purposes, regardless of the method used in transporting such animals interstate. This appears to be one sanitary measure which is of vital interest to every state regulatory official, and worthy of our best thought and action.

Feed shortages have greatly reduced the output of dairy products in Sweden, Finland, Denmark and Holland. Although there are no data available on the number of dairy cattle in these countries, the indications are that their dairy herds have been depleted through the lack of supplementary feeds formerly imported.

People are too prone, too quick to discipline animals in a manner they would never discipline a human being. Kindness begets friendliness, friendliness brings understanding between man and the animal. —*Year Book, Anti-Cruelty Society, Chicago.*

Recommendations on Increasing National Egg Production

A Veterinary Program to Meet the Present Emergency

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THE POULTRYMEN of the United States are an important factor in supplying food to the United Nations under the terms of the Lend-Lease Act, as administered by the Surplus Marketing Administration. To meet the egg-production quota set by Secretary of Agriculture Wickard, the numbers of poultry in this country will be increased greatly. This unusual expansion presages greater losses from disease and enlarges the responsibility of the veterinarian as custodian of poultry health.

The Special Committee on Poultry Diseases recognized this situation not only as a challenge to the practitioner, but also as his opportunity to serve. Accordingly, its members prepared a veterinary poultry program based upon the premise that reduction of adult mortality offers the soundest method of attaining the necessary increase.

The Board of Governors of the American Veterinary Medical Association, at a special meeting held in Chicago, January 24, 1942, approved the plan and directed that it be presented to John R. Mohler, chief of the U. S. Bureau of Animal Industry, as representing the veterinarian's contribution to the poultrymen's war effort.

The plan was presented to Dr. Mohler on February 9 and he submitted it to his Subcommittee on Poultry Production. Dr. Mohler reported that this committee endorsed it with the sponsorship of the American Veterinary Medical Association. It is believed that the plan is a practical one which and when put into effect will result in a response of unusual proportions. Its merits are set forth below.

Increasing Egg Production to Meet the Present Emergency

If the available knowledge of poultry-disease control were fully utilized, the present adult mortality and loss of egg production from disease in this country could be reduced 50 per cent in one year.

An all-out program of meat, milk and egg production is under way. The necessity of establishing and maintaining the highest nutritional standards in the populations of the United Nations is a strong challenge to American agriculture.

Since the outbreak of the war in 1939, Great Britain's poultry flocks have been reduced greatly in order to conserve feedstuffs for other farm animals. During the past year the United States has sent eggs to the British Isles in almost unbelievable quantities. To conserve shipping space and prevent damage to shell eggs, a large number of egg drying and freezing plants were established in the Middlewest.

Last fall Secretary of Agriculture Wickard asked for an increase of 500,000,000 dozen eggs in 1942 over the amount produced in 1941. On January 15, 1942, this goal for 1942 was increased to 700,000,000 dozen.

To fulfill its part in winning the war, the poultry industry must invoice its resources and outline its campaign of attack. Since the great majority of our poultry is located between the Allegheny and the Rocky Mountains, attention should be focused on this large area, where poultry is of secondary or tertiary importance on all but a few farms. Increased production can result only from:

1) Increasing the numbers of layers on farms.
2) Increasing the rate of production.
3) Increasing livability.

Obviously, a combination of these factors is most desirable, but a critical examination of the situation reveals that the 1942 egg-production goal can be reached with

*Chairman, Special Committee on Poultry Diseases.

the greatest expediency and certainty by a concentrated effort to increase livability.

1) Increasing the Numbers of Layers

The numbers of layers housed can be increased by:

a) Converting other farm buildings to poultry use.

b) Building new brooder and laying houses.

c) Increasing the number of chicks and layers per hundred square feet of floor space in the poultry buildings now in use.

a) *Conversion of Buildings.*—In the Middlewest there are only a few farm buildings that can be converted quickly and economically to poultry use without sacrificing production of other farm animals. However, such conversion will accommodate only a fraction of the 1942 increase in poultry population.

b) *Building New Houses.*—Although some construction is under way, to attempt to accommodate the entire increase through this means is clearly poor economy at this time.

c) *Decreasing Floor Space Per Bird.*—A large part of the increase must be accommodated by decreasing floor space per bird. The incidence of disease will be increased in direct proportion to the increase in crowding.

A conservative estimate of the poultry housing facilities in the United States reveals that not more than 10 per cent of the adult flocks now have adequate floor space. Authorities agree that when layers are confined, light breeds require 3½ square feet of floor space per bird in order to make a satisfactory economic return, and that heavy breeds require 4 square feet. It may be argued that Leghorns do not need 3½ square feet of floor space, that Barred Rocks do not need 4 square feet of floor space, but experiment stations have shown that the rate of egg production increases directly with floor space per bird and, conversely, that mortality decreases with the increase in floor space per bird. Also, the farmer's total poultry income will be in direct proportion to these two dicta, other factors being equal.

In other fields of animal production, housing practices are much more standard. Scarcely one out of 100 dairymen would fail to provide adequate stanchion and platform space for his animals. Stanchion stalls are almost universally 3½ feet in width; platform lengths in Utah, Wisconsin and Florida do not vary 2 inches for a given breed. If a dairy farmer has five empty stanchions and raises seven heifer calves to maturity, it would be impossible to stanchion these seven animals in five stalls. The extra heifers might be fed from buckets or, to exaggerate, they might exist by eating bedding, and roughage and concentrates by forcing their way between stanchioned animals, but the owner would not consider housing five of the seven and permitting the other two to run at large. Dairymen know that if their animals are to be productive, they must have adequate living space.

In contrast, the same farmer, having but one poultry house, may pay little attention to the floor space per bird when he houses his pullets in the fall. If he complies with the government's request and raises 15 to 25 more pullets than is his usual custom, they are likely to be housed in the same building which was either just adequate for, or crowded with, a lesser number.

A single example serves to illustrate what will happen on many farms this coming year if 100 million extra chicks are brooded. A farmer has one 20 x 20 laying house which is large enough to accommodate 100 birds of a heavy breed. However, if he rears 115 to 125 pullets this year, each pullet will have 3.4 to 3.2 square feet of space, which represents a 15 to 20 per cent reduction in space requirement.

It is obvious, therefore, that the increase in egg production can not be met efficiently, economically and soundly by increasing numbers of layers alone. Since mortality increases with crowding, and egg production decreases, additional emphasis must be placed on factors which will insure increased adult livability. On the other hand, unless additional chicks are brooded this spring, there may be an inadequate number of layers this fall.

2) Increasing the Rate of Production

Important factors in increasing the rate of production include better breeding, adequate feeding, comfortable housing, and other management details. The length of time a laying hen lives, however, is the greatest single factor in its total egg production. Combined, these factors determine the total number of eggs a given poultry flock will produce.

3) Increasing Livability

Before giving this valuable weapon its proper place in this emergency, it is well to review what has happened to the poultry

industry during the past quarter of a century.

In 1917, just prior to our entry into World War I, brooder-house mortality ranged from 20 to 40 per cent from the Allegheny to the Rocky Mountains. In 1915, just 27 years ago, a survey of brooder-house mortality of chicks up to 6 weeks of age, in one of the middlewestern states, disclosed that 55 per cent of the chick population died. In New England and on the Pacific Coast the mortality was considerably lower, but these areas produced but a small percentage of the country's total.

In severe contrast, adult mortality in the Middlewest was comparatively low, the logical result of the "survival of the fittest." Little thought was given to breed improvement in 1917; most chicks were hen hatched; a high percentage of farmers practiced "hit and miss" methods of feeding and housing. As a result, egg production was low.

The present brooder-house mortality in the United States is very low, and probably does not exceed 10 per cent up to 8 weeks of age. It is not uncommon now, even in the Middlewest, for the hog farmer, the dairy farmer and the grain farmer to raise to 8 weeks 95 to 98 per cent of the chicks they purchase. This great downtrend of chick mortality is due to a great extent to the pullorum-disease-control program. Notably in the New England states, where the campaign for the control and eradication of this disease is a quarter of a century old, the present annual loss from pullorum disease is less than 1 per cent. In the Middlewest it is estimated that, at present, less than 5 per cent of the chicks die from this disease. This is a remarkable improvement over an estimated loss of 25 per cent in 1917.

Adult mortality, however, has increased by leaps and bounds. In 1923, a Pacific Coast publication stated that the commercial poultryman lost 10 to 12 per cent of his adults annually, and that if his losses approximated 15 per cent, his year's profits were in jeopardy. The situation was comparatively the same throughout the length and breadth of the nation. Today, however, mortality studies disclose that the poultry farmer loses 30 to 40 per cent of his adult birds. One adult fowl has the inventory value of ten day-old chicks. Simple arithmetic discloses that the annual loss in inventory values alone, from adult mortality, approximate 150 million dollars. To this must be added the normal profit from these adult hens had they survived. It may be said, therefore, that the poultry industry is today staggering along with a millstone of a quarter of a billion dollars loss about its neck. Thus, it is obvious that poultry farming, instead of improving since 1917, has in some ways regressed.

To avoid entirely the poultryman's annual 30 to 40 per cent loss of his adult birds is an impossible, utopian dream. Yet, if it can be reduced by 10 points, more than one half of Secretary Wickard's requested increase will be produced. A reduction of 18 points would more than produce the needed increase of 700 million dozen eggs. These figures are based on a minimum production of 10 dozen eggs per bird.

The best military strategy is to attack the enemy at its weakest point. An examination of the facts shows that a reduction of adult mortality from its present high rate is the speediest, most efficient and most worth-while method of increasing egg production in 1942.

Increased livability is accomplished through improving disease control, management, nutrition and breeding.

As a recognized science, avian pathology is less than 25 years old. In the past two decades the geneticist, the biochemist and the husbandman have become familiar with the interlocking relationship of their respective fields with mortality.

Diseases such as pullorum disease, laryngotracheitis, fowl pox and omphalitis can be controlled and parasites, including roundworms, lice and mites, no longer need be a menace to poultry health. If adequate nutrition is provided, rickets, curled-toe paralysis, perosis, dermatitis and other avitaminoses can be prevented.

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Measures for Increasing Livability and Egg Production

It is recognized that few poultry diseases are prevented or controlled by specific drugs. It is further recognized that, since each

individual has but little value as compared to other farm livestock, in most cases the flock must be considered as a unit. Since much of the losses can be prevented by adequate nutrition and capable management, veterinary practitioners should weigh these two factors carefully in making diagnoses and instituting treatment and since, in the field, it is usually impossible to diagnose differentially the several respiratory as well as other diseases, the services of diagnostic laboratories should be sought in verifying provisional diagnoses. Several typically affected live birds should be taken or sent by express to the laboratory. If only dead birds are available, suitable fresh specimens should be taken or shipped to the laboratory, well packed in ice.

As previously stated, the suggested measures comprise improvements in:

1) Disease control.
2) Management.
3) Nutrition.
4) Breeding.

1) DISEASE CONTROL (GENERAL, SPECIFIC, NONSPECIFIC)

General Control (Routine Sanitation).— House: Buildings and equipment should be cleaned and disinfected before brooding and housing. A disinfectant with a phenol coefficiency of 3 or more should be used. The litter should be of absorbent material, 2 to 3 inches deep in the brooder house, 5 to 6 inches deep in the laying house. The windows and doors in the laying house should be screened.

Range: If movable, the brooder house should be moved to clean range. Ground where no chickens or turkeys have ranged in 1940 and 1941 should be used. All available range should be equally divided into three sections to make the three-year rotation plan effective. If clean range is not available, sun porches should be used.

Specific Control (Parasitic, Virus and Bacterial Diseases). — Parasitic Diseases (Mites, Lice, Roundworms): The appearance of mites can be prevented by an annual house cleaning and spraying with any heavy oil. In some cases spraying to control mites should be practiced twice a year. Excluding sparrows from poultry buildings is one method of preventing reinfestation.

Nicotine preparations are specific in eliminating lice. They are applied by painting roost surfaces; the application should be repeated in 10 to 14 days to destroy the newly hatched. Following roost painting, all birds must be on the roosts to prevent immediate reinfestation.

Regular examination of casualties should be followed. If roundworms are discovered, a highly efficient, nontoxic roundworm tablet should be administered individually, or the same active ingredient administered to the flock in suitable dosage, by way of the mash. The litter should be changed two days later.

Virus Diseases (Fowl Pox and Laryngotracheitis): In localities where fowl pox has been reported, routine vaccination should be practiced. Fowl-pox vaccine (chicken strain) should be employed and the birds vaccinated between the ages of 6 and 10 weeks. The brood should be free from colds, coccidiosis and worms. If these diseases are present, they should be controlled before the birds are vaccinated.

If the cockerels are to be marketed as broilers, they need not be vaccinated, but should be separated from the pullets at an early age (4 to 8 weeks) and housed or ranged separately. If this is not possible, vaccination should be postponed until the cockerels are marketed at 10½ to 12 weeks of age.

If the disease occurs in an unvaccinated laying flock, the noninfected birds should be vaccinated at once with fowl-pox vaccine (pigeon strain). In each case the directions of the manufacturer should be followed carefully.

Where laryngotracheitis has been reported, routine vaccination should be practiced between 8 and 16 weeks of age. If the disease occurs in an unvaccinated flock and is identified within 48 hours of its occurrence, the noninfected birds should be vaccinated at once.

Bacterial Diseases (Pullorum Disease and Omphalitis): In pullorum disease, blood testing must be continued vigorously to maintain and improve chick livability

and egg production. If the rapid whole blood method is employed routinely, the standard tube agglutination test should be employed before the flock is considered "clean."

Routine hatchery sanitation will prevent omphalitis.

Nonspecific Control. — The veterinarian should accept the fact that there are no specific measures to prevent or control such diseases as fowl paralysis, tuberculosis, fowl cholera, fowl typhoid, infectious colds, tapeworms, coccidiosis and chick bronchitis. During the past decade, however, research has disclosed many practical methods of reducing losses from these diseases. It is apparent that much of this information is not being put into practice. In reducing losses from these diseases, for which there is no specific prevention or control, the veterinarian should utilize the following facts.

Fowl Paralysis and Related Diseases of the Fowl Leucosis Complex: Careful culling to eliminate clinical cases from the breeding flock may aid in lowering the death rate from this disease in succeeding generations.

Tuberculosis: Surveys by the U. S. Bureau of Animal Industry disclose a high percentage of infected birds in the Central and North Central States. In these areas farmers suffer losses in both poultry and swine, which become infected with the avian strain of the organism. Prescribed methods to prevent these losses are already available. The local practitioner should consult a federal field veterinarian, inspector in charge or state veterinarian before putting control measures into effect.

Coryza (Infectious Colds): As in human beings, no specific methods of "curing" colds are known, but much can be done toward preventing losses in both birds and egg production. The following outline will serve as a guide:

a) The cause is *Hemophilus gallinarum*, not drafty houses, wet litter and internal parasites, as previously believed, although all of these factors increase the susceptibility of the flock to the disease, prolong its course and increase losses.

b) The acute, uncomplicated form lasts but a few days; the chronic, for several weeks.

c) Coryza seldom attacks brooder-house chicks. Attention should be focused on the growing pullets and laying hens. An examination should be made for external and internal parasites. When these have been excluded or controlled, the principal treatment is to encourage the greatest possible food intake, since birds infected with coryza rapidly lose weight and egg production, largely because they have little inclination to eat. Appetites are stimulated through the use of half-day feedings of a dried cheese whey flushing mash at two- to three-day intervals, or wet mashes, or some form of liquid milk, daily. During the fly season, liquid milks or wet mashes should be fed in separate containers, which, after feeding, should be cleaned carefully and left in the sun to dry.

d) Mixed bacterins and pharmaceutical preparations, with the exception of sulfathiazole (recent work done at Rhode Island State College), have been found to be of little value in preventing or controlling infectious colds.

e) Since recovered birds remain carriers for many months, noninfected pullets should not be ranged or housed with older birds.

Tapeworms: Because of the natural attachment of the scoleces of these parasites to the intestinal wall of infested birds, little advance has been made in developing satisfactory medication to expel these vicious pests; however, proper measures for controlling flies and other insects will prevent many unnecessary losses.

During the fly season, the feeding of wet mashes and liquid milks should be discouraged; if practiced, however, separate feeders should be used, as directed in the control of coryza.

The droppings should be treated at frequent intervals with a fine sprinkling of gypsum or superphosphate, both of which interrupt fly breeding. Lime may be used, but this destroys much of the value of the droppings as fertilizer. Droppings should be removed at frequent intervals and, if not used immediately as fertilizer, should be stored in a fly-proof manure pit or building, or moved a considerable distance from the poultry buildings.

In the poultry yard, boards, flat stones and trash should be removed, as these provide moist places for other insects which are also intermediate hosts of tapeworms. Under no circumstances should chickens be permitted access to other farm buildings or manure piles.

Coccidiosis: This disease continues to ex-

act a tremendous annual toll. Although much has been learned in the last decade which, when put into practice, is of material assistance in preventing the disease or, if it appears, in keeping the losses at a minimum, there is no specific drug which will cure it. Proper nursing and adequate nutrition should be instituted immediately upon making a diagnosis of coccidiosis. Coccidiosis is no exception to the rule of the thumb that "more chickens starve to death than die from disease."

In the brooder house, provided most of the chicks become infected at or about the same time, the disease may last but a few days following the appearance of symptoms. Since there is no cure for coccidiosis, attention should be focused upon factors which will encourage maximum feed consumption during the attack. A moderate, often unnoticed infection produces protection against mass doses at a later date. If large numbers of oöcysts are consumed by susceptible birds, many will succumb from hemorrhage five to seven days later.

Under average farm conditions, the majority of those affected consume sufficient coccidia to become depressed; their appetites wane and progressive emaciation occurs, followed by death.

Appetites are whetted as in the manner prescribed under coryza. Three or four feedings of a dried cheese whey mash on alternate days, in place of the regular mash, will save many birds. Deep litter tends to decrease the spread of infection through the droppings. However, the day following the first flush, the litter should be changed.

Coccidiosis may be a devastating disease in the pullet or laying flock. Usually some part of the small intestine is involved. Seriously affected individuals should be confined separately, or destroyed and burned or deeply buried. Adequate nutrition and nursing should be relied upon for keeping losses at a minimum.

Infectious Bronchitis: This disease is rapidly assuming a devastating rôle in chicken mortality, particularly in the Middlewest. There is no specific cure for this disease. Often the mortality is insignificant except in chicks under 4 weeks old. Here again, routine sanitation, adequate nutrition and good nursing are the principal factors in keeping mortality at a low level.

2) MANAGEMENT

Good management is the result of attention to details. Since it is more economical to prevent disease than to control it, the following management schedule assures proved economies. Its application will do much toward increasing livability, and egg production.

Housing Layers.—Houses and equipment should be cleaned and disinfected. Pullets should be confined when 5 to 5½ months of age. If birds are housed during warm weather, they should not be permitted out of doors until 2 p. m. Birds of different ages should be housed separately.

Litter: Depth of the litter should be increased gradually until it reaches 5 to 6 inches by the end of November. Deep litter assures warm floors, saves labor and tends to minimize the danger from infected droppings. Years of experience in New England and in other states have proved the safety and economy of this measure.

In the absence of an infectious disease, litter should be stirred frequently, wet areas removed and new litter added, but the entire litter should not be replaced during cold weather.

If a shallow litter is used, it should be changed at intervals of one month.

Absorbent materials, such as coarsely ground corn cobs, shavings, shredded corn stalks or any satisfactory commercial litter, should be used. Available litter may be mixed with straw, but straw alone is not desirable.

Roosts: Nine inches should be allowed for each bird. Either protected droppings board or manure pit should be used.

Feed Hoppers: A minimum of three 5-foot mash hoppers for each 100 birds should be provided. Hoppers should be placed at right angles to incoming light, not parallel to the south side. They should be placed on platforms of heavy wire or wooden slats.

Waterers: Fountains or troughs of 5- to 8-gallon capacity should be provided for

each 100 birds and placed near mash hoppers, on platforms. In cold weather, warm water should be provided.

Nests: One nest should be provided for each five birds. Clean litter, such as shavings or straw, should be used. Nests should be placed in the darkest part of the room.

Light: Large, clean windows are important, especially on the south and north sides. During fall and winter months, artificial light should be provided to give the layers a 13- to 14-hour day. If electricity is available, 1 watt should be used for each 5 square feet of floor space. Bulbs should be provided with reflectors.

Ventilation: Proper intake of fresh air and outgo of foul air, without drafts, should be provided.

Heat: In localities where excessive cold weather is common, stove heat may be furnished.

The Barracks Plan: On farms where but one laying house is available, it is a common practice to dispose of the laying birds at the end of the first year of production to make room for the young pullets. However, many times the older birds are still in good production, and one to two additional months of profitable egg production may be obtained by employing the "barracks plan," instead of marketing the older birds. For the duration of the emergency, it is recommended that this plan be adopted to save needed egg production. A range shelter about the size of the laying house is constructed. The shelter should have a solid roof and should be completely enclosed with wire. The furnishings should include nests, feed hoppers, waterers and roosts protected from the droppings by wire.

Culling.—When: When pullets leave the brooder house at ranging time; when they are housed, at 5 to 5½ months of age; at economic intervals during the laying season.

How: Healthy non-layers should be marketed at economic intervals, according to the size of the flocks; birds which appear out of condition or undersized should be isolated; diseased culls should be killed and burned or deeply buried.

3) NUTRITION

For many years the poultryman has thought in terms of minimum feed requirements. It is recognized today that everything should be done to encourage the highest possible feed intake, since this means not only increased egg production, but also a better rate of growth and greater resistance against disease. Scientists agree that more is known about the scientific feeding of chickens than mammals, including humans. There is a sharp contrast between our present knowledge of poultry nutrition and that of a few years ago. Principal nutrition factors which influence poultry profits are: adequate daily feed intake, ingredient quality, vitamin content of the feed and ratio of mash to grain.

Adequate Daily Feed Intake.—Heavy breeds require more than 96 lb. of feed a year to support the body requirements and a 50 per cent egg production of a hen. Leghorns require from 85 to 90 lb. This amount is 15 to 20 lb. more than was thought to be necessary a few years ago. Many high producing flocks of heavy breeds consume daily 36 to 38 lb. of total feed per 100 birds, an amount nearly double that considered to be necessary in the past.

Ingredient Quality.—Experiment stations urge poultry farmers to feed materials of high quality, since formula alone is not enough. The present emergency precludes the securing of certain poultry-feed ingredients of high quality in great quantities; therefore, care must be exercised in making purchases.

Vitamin Content of Feedstuffs.—In contrast to a decade ago, many vitamin requirements of the hen now are known. Modern chemistry has disclosed methods of determining the quantitative vitamin content of important ingredients.

Although nondegerminated farm grains contain many vitamins necessary to maintain health, growth and egg production, both profitable layers and breeders need relatively large quantities of vitamins A, D and riboflavin, which are not present in farm grains, with the possible exception of good alfalfa and yellow corn. These three important vitamins command a premium on

today's market, and the good poultryman is as much concerned with knowing that his feeds contain these vitamins in adequate amounts as that they contain adequate proteins, carbohydrates and fats.

Ratio of Mash to Grain.—Fall and early winter eggs command high prices because this production is recognized as out-of-season laying.

Most authorities agree that the protein content of a laying and/or breeding mash should be 20 per cent. A hen laying 50 per cent for the year should consume about 48 lb. of a high quality, 20 per cent protein mash and 48 lb. of grain. This provides a daily diet of about 15 per cent protein. It has been found that to support normal growth gains, and egg production from September to February, the protein intake must be in excess of that normally consumed when layers are offered mash and grain free choice. The hand feeding of grain usually prevents loss of body weight and the resulting loss of production which often is followed by a molt.

4) BREEDING

In projecting family mortality, avian geneticists are in agreement that livability tables are about as significant in poultry as in humans. Investigations disclose the comparative inherited resistance of high and low susceptibles in such diseases as pullorum disease and fowl typhoid. Preliminary observations tend to corroborate the thesis that losses from fowl paralysis may be reduced by using as breeders only mature refractory individuals within a given flock. Routine autopsies at egg-laying contests disclose that much of the mortality results from nonspecific causes. Such evidence further suggests the desirability of using effectively our knowledge of breeding for better adult livability.

While increased adult livability through breeding is demonstrable, it is not an immediately effective weapon. It must, however, take its proper place in the present program, since its benefits will be reflected in succeeding years.

[*NOTE: For additional information concerning poultry-disease control, the veterinarian is referred to "Poultry Information—Please."*]

Suggested Procedure

WHAT?

1) Put into effect a campaign to reduce losses from disease.

2) Put into effect a campaign for better management practices in caring for brooding, laying and breeding flocks.

WHERE?

Nationally—but center the attack in the Central States, including Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas and Nebraska, wherein lie the great numbers of poultry, but so distributed that they produce but a small fraction of the income from each farm.

WHEN?

As soon as this program can be correlated with programs of other authoritative agencies.

WHY?

1) An unusual demand is being made for increases in egg production.

2) Adult mortality has doubled during the last 20 years, a reduction of which presents the quickest, most economical method of attaining the desired goal of increased egg production.

HOW?

1) Enlist the aid of the U. S. Department of Agriculture, including the Bureau of Animal Industry and the agricultural extension service, state veterinarians and veterinary practitioners throughout the United States, through the coöperation of the American Veterinary Medical Association and state and local veterinary associations.

2) Coöperate with county agents, teachers in vocational agriculture and 4-H Club leaders.

3) Secure the coöperation of veterinary colleges, veterinary departments, poultry husbandry divisions and extension agencies of state colleges and universities, state poultry associations, National Poultry Federation, Record of Performance Breeders' Association, Poultry and Egg National Board, Northeastern Poultry Producers' Council, Institute of American Poultry In-

dustries, American Feed Manufacturers' Association and the International Baby Chick Association.

4) Distribute copies of "Measures for Increasing Livability and Egg Production," covering disease control, management, nutrition and breeding, to every general practitioner in veterinary medicine.

5) Distribute copies of "Measures for Increasing Livability and Egg Production" to every county agent, every teacher of vocational agriculture and every 4-H Club leader, and to all feed stores, hatcheries and poultry-marketing agencies.

Summary

An increase in egg production of 700 million dozen for 1942 is needed.

This increase can be met only by increasing the number of layers, improving livability and increasing egg production per bird.

It has been shown that increasing the number of layers alone can not accomplish the desired result.

It has been shown that increasing the livability of the adult poultry population of this country presents the speediest and most economical method of attaining the desired goal. Mortality is the greatest competitor to profitable poultry production, and avoiding this waste requires no additional expense.

Increased livability can be secured most effectively by utilizing the present knowledge of poultry-disease control. The veterinary profession stands ready to do its part in directing the disease-control phases of this program in coöperation with appropriate national, state and local agencies.

[*See also: editorial, entitled "The Association's Proposal on Increasing Egg Production," page 367, and reprint coupon on page xxiii of this issue.*]

It is significant that rolling land retains remarkable fertility in spite of the constant loss of top soil to lower levels. The hills of Pennsylvania are more fertile today than in the days of William Penn. The answer, to a considerable extent, is found in the vertical distribution of minerals in the land.

What Butter "Score" Means

"When the butter you buy has a certificate in the package that says 'U. S. 93 Score' or 'U. S. 92 Score' that means that the butter has been graded by official graders of the U. S. Department of Agriculture and found to meet certain standards," says *Consumers' Guide*, publication of the Consumers' Counsel Division of the U. S. Department of Agriculture.

"In determining the quality of butter the factors of flavor, body, color, and salt are considered by the graders.

"Highest grade is U. S. 93 score. To grade that high, butter must have a 'fine pleasing flavor.' Butter with 'pleasing' flavor rates U. S. 92 score, while U. S. 91 score goes to butter with a 'fairly pleasing' flavor.

"Deductions are made from these basic ratings for defects in color, body, or salt. The lowest score given is 85, for butter with a pronouncedly obnoxious weed, onion or garlic flavor. Butter with this flavor, plus other defects, falls below 85 and isn't given a grade.

"When the butter score is 92 or 93, the Agricultural Marketing Service of the Department grants manufacturers the privilege of using certificate of quality which they may enclose in the package.

"Butter scoring from 88 to 93 is good for table use. Butter scoring from 85 to 88 is better suited for cooking purposes."

Farmers, the Payoff Men*

Since European travel ceased to exist as a pastime, a great deal of money has been spent by states to attract tourists. The budgets for national advertising are large and most of the money is raised by levying excise taxes. Florida taxes its citrus fruit growers $750,000 a year for display ads. Idaho raises $109,000 from potato growers. Washington raises funds from apples, $250,000 it is said. An excise tax on butterfat gives Iowa an advertising budget of $94,000 a year, and so on through the various states having places to go.

*The figures are taken from Nation's Business, Dec. 1941.

Difficulties Encountered In General Practice*

C. F. VAN DE SAND, D.V.M.
Kiel, Wisconsin

COMPARING the activities of the specialist with those of the general practitioner, we find that the specialist learns more and more about less and less. His activities are confined to narrow channels, in which he can concentrate his efforts. The practitioner must keep abreast with progress made by leaps and bounds over a broad field and, therefore, can not delve as deeply into some branches as he ought to. He is sometimes obliged to seek assistance from the specialist, and he certainly ought to avail himself of that aid.

Horses

The horse is struggling for existence in competition with tractors on the farm. The use of the horse on the farm instead of motor power, is receiving a great deal of attention. If a plague of infectious or contagious diseases were to strike the horse population in a locality, it would be a calamity to farmers because they would quit raising them and turn to mechanical power, the cost of which farm income could not support.

The addition of new horses to stables is of great concern, often introducing such diseases as influenza, strangles, and infectious anemia. Some years ago, an outbreak of infectious anemia occurred on a large Wisconsin farm, owned by a wealthy lumberman. About fifty horses died of this disease on the farm within two or three years. The cause was a young mare, apparently in good health, that had been purchased. After being on the farm about six months, she showed signs of failing, and came down with anemia. The disease rapidly spread to other horses. A calamity like this would have bankrupted an ordinary farmer.

*Presented before the Section on General Practice at the seventy-eighth annual meeting of the AVMA, Indianapolis, Ind., August 13, 1941.

TETANUS

In the treatment of horses we must guard against exorbitant expense to the owner. One of the diseases sometimes involving a great expense to the owner is tetanus. We sometimes hear this complaint from veterinarians: "After treating the horse for two or three days with large doses of antitoxin, the animal died, and the owner refused to pay." If the owner is asked to make a payment in advance, he often feels insulted, having been a good client for years, and if the horse dies, he suspects the advance payment was demanded because the veterinarian anticipated such an outcome.

The procedure we follow is to carefully observe the patient, and inform the owner of the prognosis.

The method of treatment is to give 10,000 to 20,000 units of antitoxin intravenously, one-fourth grain of lobeline sulfate hypodermatically, and one and one-half pounds of magnesium sulfate dissolved in a gallon of water as an enema, daily for four or five days. If the site of infection can be found, it is curetted and disinfected. If the animal is unable to swallow, we give 4 to 6 qt. of milk, into which we have broken a dozen eggs, with the stomach tube. Sometimes we also give a cupful or two of flax seed meal in a pailful of water, by this route.

AZOTURIA

Sometimes when the veterinarian is called to see a case of azoturia, upon his arrival at the farm, the owner informs him that he has put the animal into the stable, and that the patient is all right. It is always advisable to make a careful examination and administer treatment, even if the attack seems to be mild, or the patient seems to have recovered.

About a year ago, a farmer hitched a young team, a mare and gelding, to a mower after a few days of idleness. After

working a short time, the mare began to lag. They were unhitched, taken to the stable, and I was called to see her about 10 a. m. The owner thought she had been overheated. But, examination of her urine showed hemoglobinuria to be the trouble. She was given 500 cc. of calcium gluconate, intravenously, one-fourth grain lobeline sulfate, hypodermatically, and four ounces of sodium bicarbonate dissolved in a gallon of water was given with the stomach tube. About two o'clock in the afternoon, I again received a call to this farm, as the gelding, that at the time of my first visit was in his stall eating and apparently all right, had gone down with azoturia. He died after being down about three days, despite our best efforts. The mare recovered.

COLICS

Colics and impactions still cause the practitioner some anxiety, but if he can differentiate them he should be able to successfully combat most of these troubles.

The mortality is not so high since such dangerous drugs as aconite, aloes, croton oil, and irritant drugs that cause bad after effects have been discarded. The most obstinate condition we have to deal with in this class of ailments, is impaction of the large intestine. Young horses yield quite readily to treatment.

A treatment that has been successful is the administration of 1 pound of magnesium sulfate, two drams of powdered nux vomica, two drams powdered ginger in two or three gallons of water, administered with a stomach tube. We also use enemas of 15 to 30 gallons of warm water and soap. We also prescribe fluid extract of nux vomica and cascara sagrada every three hours. Where return calls must be made, we often use sodium bicarbonate in eight ounce doses in a couple of gallons of water, repeat the enemas, and massage the bowel through the rectum.

AN UNUSUAL ACCIDENT

In the treatment of wounds and injuries, the result may determine the difference between a fifty-dollar horse and a two-hundred dollar one. A farmer living near Manitowoc, and raising purebred Clydesdales, had his farmhand haul a load of rubbish to the city dump. In backing down, the horses lost their footing, slid down the bank, and fell into a fire. One of the horses, a 3-year-old mare, was severely burned over the thigh.

The veterinarian in charge was making nice progress when one day the mare kicked through the partition at another horse and ruptured the fascia of the muscles. Within a short time a large granulation formed and became so pendulent that it hung down to the hock. We decided to remove the large mass. The mare was anesthetized with chloral hydrate dissolved in two quarts of water and given with a stomach tube. She was cast and the growth was split through the center with a scalpel, and an incision about one inch deep was made around one half of it. A saw from a Benesch fetotome was used to complete the ablation. The other half was removed in a similar manner, except that we did some blunt dissecting in the region of the stifle, to guard against having an open joint. We were surprised how rapidly the saw went through this mass, and the smooth surface it left. The growth weighed 18 pounds. The large blood vessels were cauterized, and the wound treated with astringents and sterile maggot solution. It healed completely within a year. The mare has had three or four colts since, and been a blue ribbon winner at the county fair.

Cattle

We recall accounts of deaths occurring while treating milk fever by the intravenous injection of calcium gluconate or other calcium salts. A good technic to follow, is to precede the intravenous treatment with the subcutaneous administration of one-half grain of atropine sulfate and wait a few minutes before making the intravenous injection. The solution is given slowly and shut off after every 100 cc. have flowed in. We insist that the cow is not milked for 24 hours, and have few return calls. If a return call is made we catheterize the bladder and test the urine for ketosis. If there is a positive reaction, we administer 500

cc. of a 50 per cent dextrose solution intravenously, and an ounce of chloral hydrate dissolved in water, with a stomach tube, then dissolve five No. 10 capsulefuls of chloral hydrate in 500 cc. of water and have the owner give 100 cc. of this solution in a pint of water and a cupful of syrup, morning and night.

If the reaction to the ketosis test is negative, we repeat the regular treatment for milk fever, and also pass the stomach tube and give her a pound of Epsom salt, two drams of fluid extract of nux vomica, and two drams of powdered ginger in two gallons of water, and also add an ounce of aromatic spirits of ammonia.

Coccidial Dysentery

A number of cases of coccidial dysentery have been reported the past few years. The disease occurs during the warm season (June to September) and especially in wet years. It is characterized by bloody diarrhea, reduction in milk flow, blanching of the mucous membranes due to loss of blood, rapid emaciation, and death from anemia and prostration. The *Coccidium zuerni* is the etiological factor. The sporozoites wander with the intestinal contents and penetrate into the epithelial cells of the crypts of Lieberkuehn of the large intestine, particularly into those of the rectum which is most profoundly affected; the mucosa of the colon or cecum much less or not at all, although the latter sometimes shows profound changes. One usually finds the intestine contracted. In the large intestine, particularly in the rectum, one finds thin, fluid, reddish-grey to reddish-brown contents, sometimes containing distinct blood coagula. The detection of the coccidia by microscopic examination of the feces makes the diagnosis absolute. As a prophylactic measure the ingestion of dirty water from pools and marshes must be prevented. Pasturing should be interrupted and dry feeding instituted. Good results have been reported from rectal injections with solutions of 1 per cent tannic acid or 1 per cent alum. The injection of Lugol's solution, 2 ounces in a gallon of water, is also recommended as coccidia are not very resistant to the action of iodine.

A disease similar to coccidiosis, but much more prevalent and occurring in late fall and winter months, has been observed the past few years. In a bulletin issued by the University of Pennsylvania January 9, 1932, Jones and Little submit this information:

There exists in various portions of the United States an acute disease of cows characterized by more or less severe diarrhea. Steffen and Marshall have reported such conditions, the former in Wisconsin and the latter in Pennsylvania.

In the main it may be said that outbreaks occur most frequently during the late fall and winter months and for this reason the name of "winter diarrhea" is commonly applied. Scours may appear suddenly and spread rapidly throughout the herd. Frequently all the adults and even the older heifers are attacked, but as a rule young calves rarely show physical signs. The whole outbreak may subside within a week or ten days. In other instances the condition spreads more slowly with the result that two or more weeks may be required before the disease disappears.

The symptoms are more or less characteristic; as a rule there is no fever although in a few instances certain individuals have a febrile reaction. The animals are depressed, inappetence is frequent and diarrhea is usually accompanied by a marked decline in milk secretion. High producers may give, in extreme cases, as little as 2 or 3 lb. of milk per day during the height of the disease. Diarrhea is marked and may be of a few hours duration or continuous for several days. As a rule, the severe scouring lasts from 1 to 3 days. The feces are liquid, usually chocolate colored or blackish brown in appearance. Large quantities of mucus are passed. Often the mucus is blood stained and blood clots are not uncommon in the stools.

The disease is caused by a tiny curved or S-shaped organism which belongs to the same general group as the human cholera vibrio. It is known as *Vibrio jejunum* since its principal point of attack is the jejunum and upper ileum. Here it produces a definite catarrhal inflammation, edema, degeneration of the superficial mucosa, permitting the passage of fluids and blood into the intestinal content. The disease differs in these respects from the human dysentery where the large intestine is the principal seat of inflammation.

In regard to the treatment, little first hand information can be given. Among practitioners a variety of intestinal antiseptics are used. As a rule the outcome is favorable since there is little mortality and in general the diarrhea

subsides within a few days and the milk yield returns to a nearly normal level.

That the disease is an infectious one and highly communicable must be borne in mind and in small close herds where little immunity has been acquired its introduction may prove disastrous. Care must be observed to prevent transmission from herd to herd by the boots of visitors.

PUERPERAL TROUBLES

In obstetrics we encounter monstrosities, torsion of the uterus, everted uteri, and retained placentae. The Benesch fetotome has relieved us of much hard work in performing embryotomies.

For correcting torsion of the uterus some devices are recommended, but it is best to use one's arm to avoid injury to the uterus. Study the direction of the twist, and proceed to turn it. If that can not be accomplished with the cow in the standing position, she is cast and rolled over in the direction of the twist while the operator is holding the fetus.

If we have a call for an everted uterus, we instruct the owner to strip a clean bag over it and also tell him to be careful not to injure the cotyledons. This keeps the mass warm and prevents injury to the uterus if the cow keeps getting up and down. Epidural anesthesia makes replacing the uterus comparatively easy.

If a retained placenta is easily detached, it is advisable to remove it at once. If firmly attached no attempt should be made to remove it. In that case it is treated by inserting antiseptic capsules. A preparation of neutral oil containing boric acid, bismuth subnitrate and iodoform may be used. To introduce this solution we used a fountain syringe made from a gallon bottle. If iodoform is used the owner is warned that it will taint the milk.

CHRONIC MASTITIS

Dairymen are somewhat disappointed that we have failed to develop better therapeutic agents to combat mastitis. Much has been written on the etiology and pathology of udder troubles, and tests have been developed for their detection, but not much of therapeutic value has been developed. We have used autogenous bacterins with some good results; and have used such chemical agents as formalin, sulfanilamide phenylmercuric nitrate and others with varying results. Recently the injection into the milk cistern of 1:1,500 acriflavine in a 20 per cent dextrose solution has been reported to have given good results. More work should be done to develop effective biologic and chemical agents to combat these diseases, as disposal of such animals is often a great loss to the owner.

AUTOPSIES

Performing autopsies helps to increase our knowledge, keeps owners satisfied, and often is a personal protection. One afternoon I was called to see a cow that had been having colicky pains and was now delirious. A diagnosis of lead poisoning was made. The owner could not conceive how she could be poisoned by lead as there had been no painting done on the farm for some time. I suggested that we look around the pasture. A short distance from the pasture gate we found an old broken car-battery. We searched the rest of the pasture, but found nothing. After the cow died we performed an autopsy, and found several handfuls of broken pieces of battery plates in the abomasum.

NEW REMEDIES

New preparations are frequently offered to practitioners. Their hasty use, before they have been sufficiently tested, is sometimes a source of grief. Often these preparations are lauded to the sky, then their popularity wanes and after a short time they pass into oblivion.

The mortality (human) from tuberculosis in 1900 was 200 per 100,000. The figure for 1940 was 45 per 100,000. In 12 states the rate was below 30 per 100,000 and in six states as low as 20.

"Show me a farmer who farms with horses and you will show me a man who is going to be able to pay his bills and his loan and be secure on the farm for years to come."—*Wayne Dinsmore, HMAA.*

The Treatment of Chronic Bovine Mastitis*

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CHRONIC BOVINE mastitis, caused by *Streptococcus agalactiae*, occurs commonly in dairy herds throughout the world. The disease is important for it results in a decrease in both the quality and the quantity of the milk produced by affected cows. Two other species of streptococci, namely, *Streptococcus uberis* and *Streptococcus dysgalactiae*, have been incriminated as causes of mastitis, but they occur with comparative infrequency and are, therefore, of much less significance. Unless otherwise indicated, the disease with which this paper is concerned is that caused by *Str. agalactiae*.

General Considerations

In the average dairy herd, chronic mastitis has ample opportunity to spread, for the organisms shed in the milk are carried from cow to cow on the hands of the milkers and on the cups of the milking machines. The teat sphincter serves, more or less, as a natural barrier to bacteria, but when *Str. agalactiae* is present in a herd, sooner or later conditions arise that favor its penetration into one or more quarters of individual udders. After the infection becomes established in an udder, it is persistent, frequently remaining for the duration of the animal's life. In herds where little or nothing is done to control the spread, the incidence of infection with *Str. agalactiae* may exceed 50 per cent.

The amount and severity of clinical mastitis in herds infected with *Str. agalactiae* are influenced by conditions under which the cows are kept and managed. Incomplete milking, exposure to inclement weather and perhaps certain other physical factors tend to aggravate the inflammatory process and thus precipitate acute flare-ups. It is during these periods of increased activity of the infection that the greatest damage is done to the udder tissue. Although the occurrence of clinical symptoms can be greatly reduced during lactation by good management, infected herds are a problem. Difficulty is often experienced while the infected cows are being dried up or when they freshen again. It is, therefore, to the dairyman's advantage to adopt a mastitis-control program leading toward eventual eradication.

It has been adequately demonstrated that the spread of *Str. agalactiae* can be retarded by segregating the infected cows and milking them last. However, as long as infected animals remain in the herd, even though segregated, there is always danger of further spread unless constant vigilance is maintained. Usually, it is not economical to dispose of all infected cows, since many of them, if given proper care, will remain profitable.

Although chronic bovine mastitis has been regarded as an incurable disease, that stand is no longer tenable. Numerous European investigators and a few Americans have shown that this infection can be removed from 50 to 95 per cent of the infected udders by injecting specific chemical agents into the infected quarters. Thus, with the aid of chemotherapy, many infected cows can be cured, and *Str. agalactiae* more quickly eradicated from dairy herds.

Since cows that have been cured by chemotherapy are susceptible to reinfection, it is important to control the spread by segregating the infected ones. In order to detect all of the infected cows, it is necessary to employ bacteriological tests to determine which quarters are shedding the organisms. This infection does not always manifest itself by clinical symptoms. Every infected cow must be classified as positive for mastitis and segregated from the clean animals, regardless of the condi-

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tion of her udder. Treated cows from which the organism has disappeared should be placed in a suspicious group, to be milked after the clean cows and before the positive ones, until sufficient time has elapsed to insure that they are permanently cured.

For herds where testing bacteriologically is not feasible, chemotherapy can still be used to advantage, but a much longer time will be required to eradicate the disease. In such herds, the strip-cup test, thybromol test, and palpation of the milked-out udder for fibrosis are diagnostic methods that may be used to assist in classifying the cows. The animals should be designated as normal, suspicious, or positive and they should be milked in that order. The strip-cup test should then be used at every milking, and a record kept of the reacting quarters for use as a guide to those requiring treatment.

In the application of chemotherapy to the bovine udder, certain factors must be taken into consideration to obtain the best results. Among these are the size of the udder, the degree of its activity, the extent of fibrosis, and the intensity of the inflammatory process. As a rule, it is more economical to treat the udder during the dry period. At that time, milk production is not interfered with, less of the drug is required because the udder is smaller, and its effectiveness is not reduced by dilution with milk. However, acute cases will require treatment whenever they appear. Usually, more drastic methods are necessary to produce a cure in such cases than must be used when the disease is treated during a more quiescent stage.

Development of Chemotherapy in Mastitis

The first significant advance in the chemotherapy of mastitis was reported in 1923 by Bugge[1] of Norway. He met with encouraging results by irrigating the udder with an acridine dye called "rivanol." His observations stimulated others to study the efficacy of various acridine derivatives. Entozon and trypaflavin or neutral acriflavine were found to be excellent.

ENTOZON

It consists of a nitro-acridine, rivanol lactate, amyl saccharine and sodium biborate. Seeleman,[2] Trautwein,[3] Seit,[4] and others claim to have cured from 70 to 90 per cent of the cows treated with this product. They used a 1:1,250 aqueous solution of entozon as follows:

> A rinse, consisting of 100 to 200 cc., was infused by gravity into the milked-out quarter. After a short, light massage, this was milked out and replaced by a second infusion, the volume of which was varied between 500 and 1,500 cc. depending upon the size of the quarter. The last infusion was left in lactating quarters from 3 minutes to 3 hours and in dry udders overnight.

In our trials, 11 lactating and 11 dry cows in herd M, having a total of 61 infected quarters, were treated with entozon* according to the technic developed by the Europeans. With lactating quarters, the principal infusion was left in 45 minutes to 3 hours, and overnight in the case of the dry udders. After one to three treatments had been given at 14-day intervals, *Str. agalactiae* disappeared from 55 quarters (90 per cent); 19 of the 22 cows were cured. This represents an efficiency of 86.3 per cent. Three quarters treated while dry responded unfavorably. Their teat canals became occluded by scar tissue.

Since entozon is not available at present in this country,† we turned to other acridine derivatives, namely, trypaflavin and neutral acriflavine. Udall[5] had stated that a 1:4,000 aqueous solution of trypa-

[1]Bugge, R.: Antiseptic chemotherapy. Research work of the past ten years considering specifically Morgenroth's Rivanol. (title trans.) Deut. Tierärzt. Wchnschr. xxxii (1924), p. 8.

*Supplied by Winthrop Chemical Co., Inc.

†Entozon is manufactured by the I. G. Farben Industry of Germany.

[2]Seeleman, M.: The successful treatment of mastitis with Rivanol and Entozon. (title trans.) Tierärzt. Rdsch. xxxviii (1932), p. 262.

[3]Trautwein, K., Weisshaupt, A., and Wagner, H.: Experiences with Entozon treatments in mastitis infected herds. (title trans.) Deut. Tierärzt. Wchnschr. xlii (1934), p. 337.

[4]Seit, B.: Preliminary report on the treatment of streptococcic mastitis with Entozon. (title trans.) Maanedsskrift for Drylaeger, xlvi (1934), p. 257.

[5]Udall, D. H.: The Practice of Veterinary Medicine. 3rd edition (1939).

flavin or neutral acriflavine showed some promise in the treatment of mastitis by udder infusions. We used a 1:4,000 concentration of trypaflavin on 11 lactating and 4 dry cows in a manner similar to that described for entozon. A total of 47 quarters was treated. The infection was removed from all of them after one to three treatments, but these results were overshadowed by the fact that 22 quarters (46.8 per cent) were severely damaged by excessive irritation. Apparently, the trypaflavin used was too strong for the volume infused and the time it was allowed to remain in the udder. Johnson[6] recently reported the use of a 1:4,000 aqueous solution of neutral acriflavine. His method consisted of giving two infusions of not more than 500 cc. each, which were left in the udder from 3 to 5 minutes. Of 237 quarters so treated, 164 (69.1 per cent) were cured, while 204 quarters (86.1 per cent) were cured by one or more treatments. He stated that in a few quarters, the teat canals became occluded by scar tissue.

ACRIFLAVINE AND TRYPAFLAVIN

Stableforth and Scorgie[7] recommended the use of 1:10,000 aqueous solution of acriflavine for treatment of either lactating or dry udders. After giving an initial rinse of 100 cc., they infused up to 1,000 cc. per quarter, and left this in lactating quarters for 5 minutes and in dry udders overnight. This method has been used by us on 41 lactating and dry quarters. In herd H, 5 dry cows, with 14 infected quarters, were treated, of which 13 quarters were freed of infection. In other herds, this method of treatment has not been so successful. Of 41 quarters treated thus far, only 20 have been cured, representing an efficiency of but 48.7 per cent.

Steck[8, 9, 10] of Switzerland made an extensive study of the acridine therapy for mastitis, and he reached the conclusion that *Str. agalactiae* infection is limited to the ventral portion of the quarter and that, therefore, the infusion of a large volume of fluid was not necessary. He developed a method for intensive treatment of the cistern region as follows:

> Two hundred cubic centimeters of a dilute aqueous solution of trypaflavin were infused into the milked-out quarter, followed by 200 cc. of a 1:1,500 concentration of trypaflavin in a 20 per cent sugar solution. After a short, light massage, the infused fluid was milked out into a graduated container. A second infusion of concentrated sugar-trypaflavin solution was then given, using a volume equal to the amount regained from the first infusion plus 50 cc., but stated that more than 400 cc. should not be given. This is milked out again after from 3 to 5 minutes. Steck stated that his method can be used at any time during the lactation period and also on dry cows providing the udder has not started to prepare for its next lactation. He reported that of 5,000 infected quarters so treated, 75 per cent were cured by one treatment and 90 per cent by two treatments.

STECK'S TREATMENT MODIFIED

We found that the use of two separate concentrations of trypaflavin, as recommended by Steck, was time-consuming and required additional equipment. Therefore, Steck's method was modified so that only one solution, consisting of a 1:1,500 concentration of trypaflavin or neutral acriflavine in a 20 per cent sucrose solution, was employed. This was first used by us in herd H. Thirty lactating and 2 dry cows, with 55 infected quarters, were treated as follows:

> Two hundred cubic centimeters of sugar-acriflavine were infused by gravity into the milked-out quarter as a rinse. This was milked out and followed by the infusion of 400 cc. which was left in the quarter for 5 minutes. *Str. agalactiae* disappeared from 38 quarters (69.1 per cent) following one treatment and from 51 quarters (92.7 per cent) after 1 to 3 treatments had been given at 14-day intervals. On an individual cow basis, 30 animals (93.7

[6] Johnson, S. D.: Observations on the treatment of mastitis with Acriflavine. Cornell Vet., xxxi (1941), p. 127.

[7] Stableforth, A. W., and Scorgie, N. J.: Entozon and Acriflavine for the treatment of chronic contagious mastitis. Vet. Rec. 1 (1938), p. 663.

[8] Steck, W.: An experimental comparison of different acridine derivatives for the treatment of mastitis. (title trans.) Schweiz. Arch. Tierheilk. lxxvi (1934), p. 559.

[9] *Ibid.*: A method for the eradication of mastitis in infected herds. (title trans.) Schweiz. Arch. Tierheilk., lxxvi (1934), p. 504.

[10] *Ibid.*: A system to eradicate *Streptococcus agalactiae* mastitis from the milk cow based on bacteriological diagnosis and intensive treatment of the cistern with Zysternal. (title trans.) Verlag Paul Haupt Bern-Leipzig.

per cent) were cured and not a single quarter was permanently damaged by the treatments. This success was attributed to the fact that the udders were small and the 400 cc. of principal infusion actually filled the cistern region.

The modified-Steck method was later employed in herds C, D and Z, but with less success. In these herds, most of the udders were large and, in many instances, the 400 cc. of principal infusion was not sufficient to flood the gland cistern. It was, therefore, decided to increase the volume of fluid infused and to prolong the duration of its stay in the udder in accordance with the size of the quarter and the severity of the infection. The preliminary rinse was dispensed with and a single infusion, varying between 600 and 2,400 cc., was given to individual quarters and left in for from 5 to 45 minutes. In a number of instances where the more drastic methods were used, the infection, instead of being overcome, was incited to greater activity, resulting in further damage to the udder tissue. It was concluded, however, that, with the larger quarters, the 600 cc. should be given as a single infusion and left in the quarter between 5 and 10 minutes. In acute cases, where the affected quarter is swollen, warm and often painful, a larger volume of infusion fluid is indicated. Such symptoms can usually be reduced by filling the quarter with sugar-acriflavine and leaving it in for a period of 10 minutes.

In using the modified-Steck method on the dry udder, the preliminary rinse may be dispensed with and the quarter filled with sugar-acriflavine, using up to 600 cc. if necessary. This is to be milked out again after 10 minutes, and thereafter the udder should be stripped once daily for 3 days.

A total of 181 lactating and dry quarters have been treated by the modified-Steck, sugar-acriflavine method, and of this number 106 (58.6 per cent) were freed of *Str. agalactiae* following 1 to 3 treatments given at from 7- to 14-day intervals. Only one quarter was permanently damaged by this method. Quarters exhibiting advanced tissue damage were freed of infection equally as well as less damaged ones, for, in herd D where the quarters were classified before treating according to Udall's system,[11] 47.7 per cent were cured, while but 50 per cent of the less damaged quarters were freed of infection. Some of the quarters scored as "Udall No. 4" were partially atrophied and were secreting only a purulent exudate before treatment. After the infection was eliminated, the secretion became watery and remained so for the rest of the lactation period. However, during the subsequent dry period, such quarters developed a normal parenchyma and, after freshening, they lactated normally.

When results with the acridine compounds are not checked by bacteriological tests, it is advisable to give two treatments seven days apart.

GRAMICIDIN (= TYROTHRICIN) AND COLLOIDAL SILVER OXIDE (= NOVOXIL)

Two other products, developed in this country—tyrothricin and novoxil—which are entirely unrelated to the acridine derivatives, have been used against streptococcic mastitis with encouraging results.

Tyrothricin,* at first called gramicidin, is an alcohol-soluble, water-insoluble, protein-free substance isolated from cultures of a sporulating, gram-positive bacillus obtained from the soil. Dubos,[12, 13] the discoverer of this agent, states that the active principle was found to exert a marked bactericidal effect upon all gram-positive bacteria thus far tested, whereas the gram-negative bacteria remained unaffected by it. He describes the active principle as a grayish powder, completely soluble in alcohol to the extent of at least 100 mg. per cc. An alcoholic solution, containing 20 mg. per cc., was found to retain its bactericidal activity unimpaired, when kept at room temperature, for as long as 3 months. Little, Dubos and Hotchkiss[14, 15] published preliminary reports on the method of administration of tyrothricin in cases of mastitis in which they indicated the results obtained. Their method was as follows:

From 20 to 160 mg. of tyrothricin in alcohol were diluted with 15 cc. of distilled water, to

[11]Udall, D. H., Johnson, S. D., and Ferguson, J.: The control of mastitis in New York State. The Vet. Rec. 1 (1938), p. 1417.

*Supplied by Merck & Co.

[12]Dubos, R. J.: Studies on a bactericidal agent extracted from a soil bacillus. I—Preparation of the agent. Its activity in vitro. J. Exp. Med. lxx (1939), p. 1.

[13]Dubos, R. J., and Cattaneo, C.: Studies on a bactericidal agent extracted from a soil bacillus. III—Preparation and activity of the protein free fraction. J. Exp. Med., lxx (1939), p. 249.

[14]Little, R. B., Dubos, R. J., and Hotchkiss, R. D.: Effect of Gramicidin suspended in mineral oil on streptococci of bovine mastitis. Proc. Soc. Exp. Biol. Med. vi (1940), p. 462.

[15]*Ibid.*: Gramicidin, Novoxil, and Acriflavine for the treatment of the chronic form of streptococcic mastitis. J.A.V.M.A., xcviii (1941), p. 189.

which from 25 to 50 cc. of sterile mineral oil were added. After thorough mixing, the tyrothricin-oil mixture was injected into the milked-out quarter and left in until the next milking. They report that of 32 quarters so treated, 21 (65.6 per cent) were cured.

In our trials, tyrothricin was found to be the most effective of the agents employed in the treatment of lactating udders. On the other hand, it was potentially the most irritating. The dosage must be carefully adjusted to the activity of the udder and the severity of the inflammatory process. If too large a quantity is given, a severe tissue reaction resulting in the development of a persistent, firm mass in the quarter associated with an abnormal secretion may be produced. The following dosages are suggested for best results:

Small quarters, 80 mg.; medium-sized, 120 mg.; large, 160 mg.; and very large quarters, 200 mg., to be left in for from 12 to 18 hours. In cases of acute mastitis, the dosage was increased 40 mg. for each quarter-size, except that with very large lactating quarters as much as 320 mg. were given. With the 80 to 160 mg. doses, 15 cc. of distilled water and 25 cc. of mineral oil were used; with the 200 mg. dose, 15 cc. of water and 30 cc. of oil, and with the 320 mg. dose, 30 cc. of water and 50 cc. of oil were used.

Tyrothricin was also found to be very effective for removing *Str. agalactiae* from the udder at the end of its lactation period or while dry. Eighty to 120 mg. were used per quarter and left in overnight or even longer. One quarter was injected with 120 mg. of tyrothricin when the cow was observed to be springing. This was left in the udder and five days later the cow calved, free of infection and lactating normally. A quarter on another dry cow received 120 mg. of tyrothricin six weeks before freshening. This was left in and later the cow calved free of infection and lactated normally.

Eighty-nine quarters have been treated thus far with tyrothricin, of which number 73 (82.0 per cent) were freed of infection following 1 to 3 treatments, given at from 7- to 14-day intervals.

*Novoxil** is described as a colloidal dispersion of silver oxide in a light mineral oil. The work of Lentz on silver oxide suggested to Weirether[16] and his associates that this preparation might be effective in rendering infected quarters free from mastitis organisms. They report that from 6 to 8 injections of 1, 5, or 10 per cent silver oxide were given to three quarters, respectively, at daily intervals. *Str. agalactiae* disappeared from the milk for periods varying between 11 and 37 days. The conditions of their experiment were such that the treated quarters could not be protected from reinfection. Klein, Kleckner and Biltz[17] used novoxil liquid on 23 cows with 67 infected quarters. The infection was removed from 59 quarters (88.1 per cent). They concluded that from 3 to 5 injections should be given at 24-hour intervals. Two of 3 cows treated 8 to 10 days before calving with a single injection of 10 cc. per quarter, which was left in, were cured. Little *et al.*[15] treated 17 quarters with novoxil and 10 of these (58.8 per cent) were cured.

In our trials, a 5 per cent dispersion of silver oxide in mineral oil was used. When more than one treatment was required to cure, they were given weekly rather than daily. In lactating udders, doses of 10, 15 or 20 cc. per quarter were injected depending upon their size, and these were left in for 12 to 18 hours. Of 23 lactating quarters treated, 14 (60.8 per cent) were freed of infection. Nine of these responded to one injection, 4 required 2 injections and 1 was cured after the third treatment.

The most encouraging results were obtained with novoxil when it was used on dry cows shortly before calving. In such cases, a single injection of 10 cc. was given and left in the udder. Seven dry cows, with a total of 11 infected quarters, were treated. All of them freshened free of infection and lactated normally. Six of the cows were treated when they were springing, and one of them during the middle of its dry period or 7 weeks before calving. These results are gratifying, since 4 of these animals had been given

*Supplied by E. R. Squibb and Sons.

[16]Weirether, F. J., Anderson, E. O., Johnson, R. E., and Plastridge, W. N.: Preliminary report on the effect of Colloidal Silver Oxide on bovine mastitis. Amer. J. Vet. Res., ii (1941), p. 141.

[17]Klein, L. A., Kleckner, A. L., and Biltz, R. O.: Effect of Novoxil Liquid on catarrhal mastitis and on *Streptococcus agalactiae* udder infections. Amer. J. Vet. Res. ii (1941), p. 145.

up as incurable after having been treated twice with sugar-acriflavine while dry.

OTHER TYPES OF UDDER INFECTIONS

A variable number of quarters infected with *Str. uberis* or *Str. dysgalactiae* was encountered in all of the herds. These infections seldom produced clinical symptoms of mastitis and frequently the streptococci disappeared spontaneously. In several instances, after a quarter had been freed of *Str. agalactiae,* it became infected with one or the other of the above-named species of streptococci. Quarters carrying a persistent infection with either of these organisms were treated. On 32 of such quarters, one or more of the various drugs were used, and of these, 24 (75 per cent) were freed of infection as follows:

Of 10 quarters injected with novoxil, 8 were cured; of 3 treated with tyrothricin, 2 were cured; of 5 infused with a 1:10,000 aqueous solution of neutral acriflavine, 3 were cured; and of 14 quarters treated with a 1:1,500 concentration of neutral acriflavine in 20 per cent sugar solution, 11 were cured.

Cows infected with toxin-producing staphylococci were found frequently in two herds. These infections were persistent but they were rarely accompanied by visible manifestations of mastitis. While the milk from such quarters became alkaline intermittently, the strip cup seldom revealed abnormal milk. In these herds after *Str. agalactiae* had been eliminated from quarters by chemotherapy, it was often observed, especially in the older cows, that toxin-producing staphylococci became the predominating organisms. A number of quarters shedding these organisms were subjected to treatment, but as a rule, the staphylococci persisted regardless of the drug used or the number of treatments given.

Appendix

Mastitis tests.—The tests employed for the detection of mastitis were the strip-cup test, brom-cresol-purple paper test for pH, palpation of the milked-out udder for fibrosis, the microscopic examination for streptococci of stained smears of incubated milk, and the fishing of streptococci from ox-blood agar plates and their classification on differential media. The procedures followed in making the various tests have been published.[18, 19]

Herd management.—Before treating a herd, the cows were classified as negative, suspicious, or positive for mastitis. They were segregated accordingly and milked in that order. Cows shedding *Str. agalactiae* were placed with the positive group regardless of the clinical findings. The suspicious group consisted of cows reacting to one or more of the tests but from which *Str. agalactiae* was not isolated.

Collection of milk samples.—In herds M, H and D, milk samples for bacteriological study were collected on the seventh day following administration of a therapeutic agent in order to determine whether a cure had been obtained. If *Str. agalactiae* was still present in the sample, a 14-day period elapsed before the quarter could be treated again, as the dairies were visited weekly. In herds C and Z, the herdsman collected samples on the fifth day after treatment, incubated them overnight and prepared stained smears for microscopic study. Thus, cows still shedding streptococci could be treated again at the next weekly visit. Milk samples were always collected by us on the seventh day for verification of the results of the field microscopic test, in the laboratory. During the rainy season, however, when the corrals were muddy, it was found that atypical streptococci had frequently invaded the udder. Since these organisms could not be distinguished from *Str. agalactiae* with any degree of certainty by morphology alone, the field microscopic test could not be depended upon as a criterion for re-treatment as long as the muddy conditions prevailed.

Preparation and administration of the therapeutic agents.—The udders to be treated were washed, prior to drawing the milk samples for bacteriological study, with a chlorine solution containing approxi-

[18]Schalm, O. W.: The treatment of streptococcic mastitis by infusion of the udder with Entozon. J.A.V.M.A., xcvii (1940), p. 20.

[19]*Ibid*: The use of Trypaflavin in the infusion therapy for streptococcic mastitis. Amer. J. Vet. Res., ii (1941), p. 117.

mately 400 parts per million of available chlorine. They were then milked out thoroughly and, immediately before giving a treatment, the tip of the teat was disinfected with alcohol. The teat tubes or teat cannulas used in introducing the therapeutic agent into the quarter were kept in alcohol between injections and care was taken to keep all other equipment free from contamination.

Solutions of entozon and trypaflavin or neutral acriflavine were prepared at the dairy immediately prior to their use. Boiled, filtered tap water was used as the diluent and this was transported to the dairy in gallon jugs. Weighed samples of the acridine compounds, sufficient for the treatment of one or more quarters, were kept in small vials. The infusion fluid was mixed in a graduated 4,000-cc. aspirator bottle, from which it was allowed to flow by gravity, through a rubber hose fitted with a teat tube,* into the udder-quarter.

Sugar solution for Steck's method of treatment was prepared in concentrated form and sterilized in a steam bath. The stock solution was made in the ratio of 120 Gm. of household sugar, dissolved in a quantity of water sufficient to make a total volume of 150 cc. This amount, when added to 450 cc. of water containing 0.4 Gm. of trypaflavin or neutral acriflavine, makes a 1:1,500 concentration of the acridine dye in a 20 per cent sugar solution.

Tyrothricin was prepared by dissolving 1 Gm. of the powder in 25 cc. of 95 per cent ethyl alcohol. This gives a stable stock solution containing 40 mg. of tyrothricin per cc. Immediately prior to giving a treatment, 2 or more cubic centimeters of this stock solution (depending upon the dosage desired) were transferred to a sterile glass graduate with a sterile pipette. Fifteen cubic centimeters of sterile distilled water and 25 to 30 of heavy medicinal mineral oil were added. The mixture was shaken vigorously until a fine emulsion was obtained. The entire amount was injected immediately with a 50-cc. ground-glass syringe fitted with a teat cannula.

Novoxil was supplied in bottles containing 100 cc. of a 5 per cent silver oxide in mineral oil. Since the silver oxide settles upon standing, it is necessary to shake the bottle thoroughly before drawing out the quantity required for treatment. Ten, 15 or 20 cc. were injected per quarter. The doses were massaged well up into the milk cistern.

*The teat tubes commonly supplied by instrument firms were found to be too large in diameter for general use. The Bowen style milking tube, which tapers to a blunt end, has proved to be satisfactory.

Results Obtained with Chemotherapy in Individual Herds

Herd M, a certified milk herd in which entozon was used.—The data on this herd were reported in a previous paper.[18]

Herd H.—In a report on this herd,[19] only the results obtained with a modification of the Steck sugar-trypaflavin method of treatment were given. Besides this, 13 dry cows were treated with a 1:10,000 aqueous solution of trypaflavin. The quarters were filled with the infusion fluid, which was left in overnight. Thereafter, the udders were stripped once daily for three days. The owner sold 8 of these cows before sufficient time had elapsed for them to calve again; but 5 of them, with 14 infected quarters, remained in the herd. Of these quarters, 13 had received 1 infusion, while 1 quarter had required 2 treatments. After calving, these cows were sampled repeatedly, and only 1 quarter was found to be shedding *Str. agalactiae.* Thus, 92.8 per cent of the quarters on these 5 cows had been freed of their infection with a 1:10,000 aqueous solution of trypaflavin while dry. To prevent an erroneous conclusion regarding this method, it must be stated that these results could not be duplicated in other herds.

Herd D, a Holstein herd, consisting of approximately 150 mature cows producing a Grade-A milk.—The circumstances relating to the mastitis flare-ups at the time of the preliminary survey are of interest. They indicate the possible relationship of incomplete milking to the incidence of clinical mastitis in herds infected with *Str. agalactiae.*

Milking was done by hand until 8 months

prior to the start of our work. As an inducement to milk thoroughly, a milker's salary had been determined by the amount of milk he obtained from his string. However, the owner, in order to reduce his labor costs, constructed a walk-through type of milking parlor, in which the cows were milked by machine but not stripped afterwards. The change from hand to machine-milking was made abruptly. Considerable difficulty was experienced in training the cows to be milked by the new system. As a result, a number of them held up their milk. Not long afterwards, mastitis, which had not been serious before, became an important problem. Acute flare-ups of mastitis began to appear, especially in the older cows. These animals were then placed on hand-milking; but, as soon as the clinical symptoms subsided, they were returned to the new system. In many instances, the inflammatory process flared up again in these animals within a few days, and they had to be hand-milked permanently.

In the preliminary survey, 150 lactating cows were tested. Of this number, 64 (42.6 per cent) were found to be shedding a nonhemolytic *Str. agalactiae*. At this time, 54 per cent of the infected cows were positive to the strip-cup test, 60 per cent showed advanced tissue damage detectable by palpation of the milked-out udder, and 73 per cent were producing alkaline milk from one or more quarters. Cows shedding *Str. agalactiae* were hand-milked, while the remainder were milked by machine without stripping afterwards. As further spread of mastitis was checked in this manner, the owner was able to continue the new system of milking without danger of acute flare-ups. Infected cows, cured by chemotherapy, were thereafter milked by the new system without difficulty.

Three cows, with a total of 7 quarters shedding *Str. agalactiae*, were treated with a 1:10,000 aqueous solution of trypaflavin. A 200-cc. rinse was followed by the infusion of 1,000 cc. per quarter, which was left in for from 5 to 15 minutes. All quarters were still infected after two treatments.

Since the sugar-trypaflavin method had proved effective in herd H,[19] it was decided to use that method in this herd. However, since the udders of these cows were much larger than those treated in herd H, it was evident that a 400-cc. principal infusion would not be sufficient in many cases to flood the cistern region. In the first series, the original technic of infusing a preliminary rinse of 200 cc. followed by the infusion of 400 cc. to be left in for 5 minutes, was used. Fifty-six quarters on 31 cows were treated in this manner, and only 17 (30.3 per cent) were cured by the first infusion as compared with 69 per cent from one treatment in herd H. It was decided that it would be necessary to increase the volume of fluid infused and to prolong the duration of its stay in the udder in accordance with the size of the quarter and the severity of the infection. The preliminary rinse was dispensed with and a single infusion, varying between 600 and 2,400 cc., was given to each quarter and left in from 5 to 45 minutes. In a number of instances where the more drastic treatments were used, the infection, instead of being overcome, was intensified, and as a result, some cows had to be sold. It was concluded, however, that in the larger udders, the 600 cc. should be given as a single infusion and left in the quarter between 5 and 10 minutes according to the severity of the infection.

Forty-six cows in this herd, with a total of 90 infected quarters, were treated with sugar-trypaflavin or acriflavine, and of this number, 23 (50 per cent) were freed of *Str. agalactiae* infection. As shown in table I, 31 quarters responded to one infusion; 9 quarters required 2 treatments; 2 quarters required 3 treatments; and 1 quarter was cured only after 7 treatments. Of the 23 cows that did not respond to sugar-trypaflavin treatments, 13 were sold as incurable, 10 remained in the herd and were subsequently treated by other methods, as follows: Four, each with only one infected quarter, were given a 1:1,000 aqueous solution of trypaflavin, which was left in the quarter in order to destroy it. This produced an occlusion of the teat

canal by scar tissue. Four other cows, with six infected quarters that had failed to respond to sugar-trypaflavin treatments, were subsequently treated with 160 mg. of tyrothricin each. Four quarters were freed of infection by one treatment, while 1 quarter was still infected after 2 treatments and another after 3 treatments. Two cows, each with 1 infected quarter that had not been cured by sugar-trypaflavin, were treated with 20 cc. of novoxil, which was left in for 12 hours, but the infection persisted.

Seven other cows, with 15 infected quarters, were treated with tyrothricin. Eighty to 320 mg. were used, depending upon the size of the quarter and the severity of the infection. Ten quarters responded to 1 injection, 1 required 2 treatments, and 3 required 3 treatments. The one quarter not cured was still infected after 3 treatments. Tyrothricin produced a severe reaction in 3 quarters, resulting in the development of a persistent firmness of the cistern area. In these cases, the dose was apparently too large for the size and activity of the quarters. Two of the quarters had received 120 mg. and the other, 200 mg.

Novoxil was used on 5 other cows, with a total of 6 infected quarters. Ten, 15 or 20 cc. were injected, depending on the size of the quarter, and left in for 12 hours. Five of these quarters were cured, 4 after one treatment, while 1 quarter required 3 injections to eliminate the infection. The quarter that failed to respond had received 3 injections of novoxil at 14-day intervals.

Fifty-nine lactating cows were treated in this herd. Of these, 38 (64.4 per cent) have been cured. The results obtained by the various methods of treatment are summarized in table I.

Herd C, a dairy consisting of approximately 200 mature cows of the Holstein-Friesian and Guernsey breeds, producing Grade-A milk.—Hand-milking was used and the milkers' salaries were determined by the amount of milk they obtained, as an inducement to milk thoroughly. By good management, especially thorough milking, acute flare-ups of mastitis were kept at a minimum during lactation, but considerable difficulty was experienced from the disease when animals were being dried up or again at calving. The owner was anxious to eradicate the infection and preferred treatment at the termination of lactation in order not to interfere with production.

In the preliminary survey, 197 lactating and dry cows were tested, 77 (39.1 per cent) of which were found to be infected with a hemolytic *Str. agalactiae.* Fifteen of the infected lactating animals (19.3 per cent) gave a strip-cup, positive reaction, but usually this was limited to the first stream of milk, while 61 per cent were producing alkaline milk from one or more quarters. The infected animals were segregated and milked last. As they approached

TABLE I—Summary of the Results Obtained with Chemotherapy in Herd D

Agent Used and Quarters Treated	Quarters Cured by Treatments							Total	Per Cent	Quarters Still Infected After Treatments							Total
	1	2	3	4	5	6	7			1	2	3	4	5	6	7	
Trypaflavin 1:10,000 7 quarters	0	0	0	0	0	0	0	0	0.0	0	7	0	0	0	0	0	7
Sugar-trypaflavin or sugar-acriflavine 90 quarters	31	9	2	0	0	0	1	43	47.7	12	11	10	8	5	1	0	47
Tyrothricin 21 quarters	14	1	3	0	0	0	0	18	85.7	0	1	2	0	0	0	0	3
Novoxil 8 quarters	4	0	1	0	0	0	0	5	62.5	2	0	1	0	0	0	0	3

TABLE 2—Summary of the Results Obtained with Chemotherapy in Herd C

Agents Used and Quarters Treated	Quarters Cured by Treatments			Total	Per Cent	Quarters Still Infected After Treatments			Total
	1	2	3			1	2	3	
Trypaflavin 1:10,000 5 Quarters	0	0	0	0	0.0	2	3	0	5
Sugar-trypaflavin or sugar-acriflavine 33 Quarters	11	5	4	20	60.6	4	3	6	13
Tyrothricin 24 Quarters	9	3	3	15	62.5	1	2	6	9
Novoxil 15 Quarters	5	4	0	9	60.0	0	1	5	6

the end of their lactation period, they were transferred to a hospital unit to be treated before being turned out with the dry cows.

Until then, 32 cows had been treated, 17 of which (53.1 per cent) were cured. Trypaflavin, neutral acriflavine, tyrothricin and novoxil were used. Sixty-two individual quarters were treated, 34 of which were freed of their infection through the use of one of these single agents. Of 28 quarters that were not cured with the first agent employed, 14 were subsequently treated by another method. Ten of these were freed of infection by this procedure, bringing the total number of cured quarters to 44 (70.8 per cent).

The results obtained in herd C with the various methods of treatment are summarized in table 2.

Herd Z, a Holstein and Guernsey herd, consisting of approximately 120 mature cows producing Grade-A milk.—The owner had experienced considerable trouble from chronic mastitis. Each year there were flare-ups during the rainy season which subsided in the summer. The cows were kept in dirt corrals between milkings. In the winter these became so muddy that it was not possible for the animals to find a dry place on which to lie.

In the preliminary test, 119 lactating and dry cows were sampled, 77 (64.7 per cent) of which were found to be shedding a nonhemolytic *Str. agalactiae*. The owner favored treatment of the cows at the end of lactation or when they were dry. Trypaflavin, tyrothricin and novoxil were used.

Four dry cows, having a total of 9 quarters infected with *Str. agalactiae*, were treated with a 1:10,000 aqueous solution of trypaflavin, which was left in overnight. One quarter was freed of its infection by 1 infusion, while 8 quarters were still infected after 2 treatments. These were subsequently treated with a 1:1,500 concentration of trypaflavin in 20 per cent sugar solution. A sufficient quantity was infused to fill out the quarter, but not more than 600 cc. were given. After 7 to 10 minutes, the infusion fluid was milked out and thereafter the udder was stripped daily for three days. Two of the 8 quarters were cured by 1 infusion, while the remainder were still infected after 2 of these treatments. Three of the remaining 6 infected quarters were on one cow, and they were treated with tyrothricin after freshening. Two hundred milligrams of tyrothricin were injected into each quarter without producing a cure. The 3 other infected quarters in this group, on 2 cows, were finally treated as follows: When the cows were springing, 1 quarter was treated with 120 mg. of tyrothricin, and 2 quarters each received 10 cc. of novoxil. The agents were left in the udders. One cow freshened 5 days and the other, 8 days later. The treated quarters were lactating well and *Str. agalactiae* was not isolated from them. Thus, of the 4 cows in the experiment, 3 were finally freed of infection.

Eleven dry cows, with a total of 24 quarters shedding *Str. agalactiae*, were treated

with sugar-trypaflavin in the manner described above. Sixteen quarters on 7 cows were freed of infection, and of these, 13 responded to 1 infusion, while 3 required 2 treatments. The infection persisted in 8 quarters on 5 cows even after 2 treatments. One of these animals, with only 1 quarter remaining infected, calved again within a week after the last treatment. Two weeks later the infection was removed from this quarter by a single injection of 160 mg. of tyrothricin. Another cow, also with a single quarter infected, was treated while dry, with 120 mg. of tyrothricin, which was left in. Six weeks later she calved, free of infection and lactating normally. Three other cows of this group, with a total of 6 infected quarters, received 10 cc. of novoxil in each. Two cows were springing at the time and, within a week, they dropped their calves. The treated quarters were lactating well and *Str. agalactiae* was not found in them. A hemolytic staphylococcus was present in all quarters of one of the cows, however. The third cow of the group was treated with novoxil during the middle of its dry period or 7 weeks before calving. She also freshened free of infection and lactating normally. Thus, the 11 cows in this experiment were all freed of infection.

Fifteen cows, having a total of 28 quarters shedding *Str. agalactiae*, were treated with tyrothricin at the termination of their lactation period. Seventeen quarters each received a 120-mg. dose, which was left in overnight and 11 quarters each received an 80-mg. dose which was left in 7 quarters overnight and was not milked out again from 4 quarters. All quarters receiving a dose of 120 mg. developed a severe tissue reaction which subsided after 7 to 14 days, while those injected with 80 mg. exhibited but little evidence of irritation. All of the cows in this group were freed of infection; 25 quarters responded to 1 treatment, 2 quarters to 2 treatments, and 1 quarter required 3 injections. Sufficient time had not yet elapsed for these cows to have freshened again, but there was no reason to believe that they would not calve free from infection and lactate normally.

Seven cows, with 10 infected quarters, were treated with tyrothricin during lactation. Each was injected with a 120-mg. dose which was left in overnight. Seven quarters were freed of infection by 1 treatment, while 2 quarters required 2 injections. Two quarters reacted unfavorably to treatment. They developed a persistent firmness of the cistern region and thereafter produced only a small quantity of discolored secretion. A cow with acute mastitis in one quarter was not cured by 3 weekly injections, consisting of 200, 200, and 320 mg., respectively. Although the

TABLE 3—Summary of Results Obtained with Chemotherapy in Herd Z

Agents Used and Quarters Treated	Quarters Cured by Treatments			Total	Per Cent	Quarters Still Infected After Treatments			Total
	1	2	3			1	2	3	
Trypaflavin 1:10,000 9 Quarters	1	0	0	1	11.1	0	8	0	8
Sugar-trypaflavin or sugar-acriflavine 32 Quarters	15	3	0	18	56.2	0	14	0	14
Tyrothricin 44 Quarters	35	4	1	40	90.9	3	0	1	4
Novoxil* 11 Quarters	11	0	0	11	100.0	0	0	0	0

*Single injection of 10 cc. made 5 to 12 days before calving and left in the udder-quarter.

clinical symptoms subsided during the course of treatment, the infection persisted.

Three cows, each with a single infected quarter, were treated, when springing, with 10 cc. of novoxil, which was left in. From 5 to 12 days later, these cows freshened free of infection and lactating normally.

A total of 40 cows in herd Z was treated, 38 (95.0 per cent) of which were classified as cured. The relative efficiency of the various methods of treatment in this herd are summarized in table 3.

SUMMARY

1. The eradication of *Streptococcus agalactiae* from the bovine mammary gland by the infusion or injection of entozon, trypaflavin, neutral acriflavine, tyrothricin, or novoxil has been tried in 5 dairy herds, having a total of 750 mature cows.

2. Thus far, 185 cows, with 345 infected quarters, were treated with one or more agents. Two hundred and eighty-eight quarters (83.5 per cent) have been freed of infection. On an individual cow basis, 137 animals (74 per cent) have been cured.

3. The percentage of infected cows responding to udder injections of specific therapeutic agents varied with the individual herds as follows: herd C (53.1 per cent); herd D (64.4 per cent); herd H (91.9 per cent); herd M (86.3 per cent); and herd Z (95.0 per cent).

4. The number and percentage of quarters cured by the various methods of treatment in these trials are as follows:

	Quarters Treated	Number Cured	% Cured
Entozon	61	55	90.0
Tyrothricin	89	73	82.0
Novoxil	34	25	73.5
Sugar-acriflavine	181	106	58.6
Acriflavine 1:10,000	41	20	48.7

5. The treatment of the dry udder with either novoxil or tyrothricin may prove to be the most practical means for eradication of *Str. agalactiae* from dairy herds.

6. Infections with *Str. uberis* or *Str. dysgalactiae* responded to treatment at least as well as those caused by *Str. agalactiae*. On the other hand staphylococcic infections were comparatively resistant to chemotherapy.

Get Horses Ready for War

W. J. Rumney of Hamilton, Ont. (Captain Rumney in military life), who is secretary of the Ontario Veterinary Medical Association, made the headlines of the *Toronto Daily Star* during the annual meeting of the provincial association in January, when he argued that Canada's 3,000,000 horses were ready for war and may be needed before the war is over. The Dominion is making a mistake in not recognizing the facts, the Doctor said. He argued for the re-establishment of the Canadian Veterinary Corps so that veterinarians will be prepared when the emergency comes. There is the success of the Russian cavalry and horse-drawn artillery to ponder, and who has forgotten the long lines of horse-drawn artillery of the Germans parading on the Champs-Élysées when they took possession of Paris. He urged that Canada do something about its cohort of unemployed animals, which could be quickly trained in the military art and perhaps save the day should mechanized vehicles bog down.

Color of the shell tells you nothing about the freshness or quality of the egg. It tells you nothing about the color of the yolk inside, either. White and brown shelled eggs can have light or dark yolks. It's true that when you get a golden yolk, you can be sure the egg is rich in vitamin A and probably vitamin D. But light colored yolks may be just as rich, or richer, though you can't be as certain about it.—*Consumer Notes, USDA.*

Some Observations Regarding Vitamin Requirements of Thoroughbreds in Training*

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THE IMPORTANCE of lime in feeding animals was described as early as the middle of the seventeenth century. Within the last three decades direct experimental evidence through research in nutrition has revealed the causes and methods of preventing diseases in domestic animals due to calcium, phosphorus, and other deficiencies of essential minerals. The discovery within recent years of the rôle played by vitamin D in the metabolism of calcium and phosphorus has given a strong impulse to further investigation in the interesting interrelationship of vitamins and minerals in nutrition.

VITAMIN THERAPY COMPLICATED

Further research in biochemistry has revealed that vitamin D, both natural and synthetic, may exist in different forms, and that some may be more active for one animal species than another. Also it has been found that the vitamin A of green plants is actually a group of plant pigments, each of which must be converted to vitamin A by the animal before it can be utilized and exert its action. Furthermore, it is known that in natural foods there exists a series of vitamins designated as the B complex group, some of which have been isolated and described and others which are known to exist but whose identity and even functions are still among nature's unsolved secrets. Undoubtedly, there are other vitamins (E and K and perhaps many yet to be discovered) as well as endocrine secretions that play important rôles in metabolism and the general well-being. These discoveries tend to make vitamin therapy more complicated.

In spite of the complicated nature of vitamin therapy, those interested in the practical aspects of animal nutrition (and this applies to large animal practice as well as to the more highly specialized field in small animals) are definitely impressed by the alleged multiplicity of vitamin and mineral deficiencies and the diversity of symptoms and conditions that are attributable to each of the known vitamins. Multiple nutritional deficiencies in man have been described by various investigators, including Haden,[1] Sebrell,[2] Scott and Janeway,[3] Mackie[4] and others. Scott and Janeway have stated that multiple deficiency is the rule rather than the exception. Haden states: "A nutritional defect is frequently multiple, although often one defect is more prominent."

In considering the nourishment of the horse with respect to its vitamin requirements we have little to go by, except concepts drawn by analogy from the knowledge of human nutrition and that of smaller animals, such as the dog and cat and other domestic animals. Sir Arnold Tyler and du Toit in South Africa, Kintner and Holt in the U. S. Army, Hare and Mitchell in England, and Williams, Frost, Kintner, Campbell and others in this country studied skeletal diseases of the horse with reference to mineral deficiencies and the calcium-phosphorus balance, and have recorded interesting observations and results of their research. However, during this year and last, Hart and his coworkers[5, 6] at the University of California have given us impor-

*Read before the Section on General Practice, 78th annual meeting of the AVMA, Indianapolis, Ind., Aug. 13, 1941.

[1]Haden, R. L. J.A.M.A., cviii (1936), pp. 261-5.
[2]Sebrell, W. H. J.A.M.A., cxv (1940), pp. 861-4.
[3]Scott, J. R. and Janeway, M. Mc.: New York State Journal Medical, xi (1940), pp. 440-3.
[4]Mackie, T. T.: The Factor of Deficiency States, J.A.M.A., civ (Jan. 19, 1935), pp. 175-8.
[5]Guilbert, H. R., Howell, C. E. and Hart, G. H.: J. Nutri., xix (Jan. 1940), pp. 91-102.
[6]Howell, C. E., Hart, G. H. and Ittner, N. R.: Vitamin A deficiency in horses. Am. J. Vet. Res., ii (Jan. 1941), pp. 60-74.

tant information on the rôle that vitamins are destined to play in the feeding of horses.

HORSE FEEDS NUTRITIONALLY DEFICIENT

Theoretically, the horse subsisting on home-grown feeds should be more or less free from nutritional defects due to lack of vitamins or minerals or both. Unfortunately, factual data belie this theory. Due to various causes previously reported,[7] such as heavy cropping and mineral depletion of the soil, lack of grazing land and the reliance on commercial feeds, which for economic reasons are vitamin and mineral deficient, the horse may suffer from a low intake or an improper balance of these vital substances.

Tabulated data published by the U. S. Department of Agriculture on the vitamin and mineral content of various feed stuffs normally used for horses, show that marked variations exist. To properly evaluate feed, in order to obtain constant blends, one would have to make countless analyses that would be difficult and costly.

Since the growth and activity of the Thoroughbred are more exacting than those of farm or pleasure horses, one must assume that the Thoroughbred in training or breeding, requires greater amounts of these vital nutritive factors.

Most investigators agree that horses are likely to suffer from a lack of vitamins A and D as well as calcium and phosphorus. Craige and Gadd[8] demonstrated the relationship between bone weaknesses in horses and disturbances of calcium and phosphorus metabolism. Jones[9] pointed out that the rations of farm animals are deficient in vitamins A and D, but are less likely to be deficient in vitamins E, K and some of the B group. Possibly this conclusion may be more theoretical than factual and worthy of further consideration. All are aware of the deficiency of certain vitamins in our own food which, theoretically, is supposed to contain these factors in adequate amounts. McLester has referred to the "numerous vague borderline states of ill health" which he attributes directly to various vitamin deficiencies. We can not overlook the possibility that certain "vague borderline states of ill health" commonly present in the Thoroughbred horse, may also be due to deficiencies not only of vitamins A and D but also of vitamin B_1 and other factors of the B complex.

To wait for clinical proof on this point, which might take years, would not be practical. Fortunately, the availability of almost all of the vitamins and minerals in pure or concentrated form enables us to test and evaluate their use as supplements to the diet of the horse in a practical manner, and without fear of causing toxic manifestations.

TREATMENT EXPERIMENTALLY STUDIED

In a group of horses under our observations, we were able to detect such symptoms as extreme nervousness, apparent irritation of the cutaneous nerve endings, anorexia, certain types of muscular paralysis (tying up), muscular fatigue (shivering) and the syndrome commonly described by horsemen as "not doing well" which, we have felt, might be of nutritional origin. We were fortunate enough to obtain, in experimental amounts, a supply of a vitamin-mineral supplement* designed specifically for horses in training. A few clients, who were owners and trainers of a sufficient number of valuable, well-bred Thoroughbreds which enabled us to have a group of check animals, were anxious and willing to coöperate in carrying out the experiment. The number of animals observed was approximately 60 horses in training, a few brood mares with foals at foot, and a few barren mares, totaling about 85 head.

Young horses with many of the symptoms above mentioned that received a liberal amount of vitamin and mineral supplement in the ration while training, showed marked improvement in condition. We are

[7]Way, Cassius, The Importance of Vitamin-Mineral Supplements in Equine Nutrition, J.A.V.M.A., xcix (Aug. 1941).

[8]Craige, A. H., and Gadd, J. D.: The Determination and Clinical Correlation of Variations in the Calcium, Inorganic Phosphorus, and Serum Proteins of Horse Blood, Am. J. Vet. Res., ii (1941), p. 227.

[9]Jones, J. H.: The Relation of Vitamins to the Nutrition of Farm Animals, J.A.V.M.A., xcvii (1940), p. 327.

*Chevinal, product of U. S. Vitamin Corporation.

more and more convinced that multiple vitamin deficiency in Thoroughbreds in training is much more common than is generally supposed. Some of these horses received, in addition to the oral administration, intramuscular injections of liberal amounts of vitamin B complex in the form of Poly-B Ampules (Sterile)* (= thiamine hydrochloride 20 mg., riboflavin 2 mg., vitamin B_6 20 mg., nicotinic acid amide 20 mg., in 0.62 per cent salt solution) twice each week for 4 or 5 weeks. In every instance, the trainers were pleased with the improvement in the treated horses. The administration of these vitamin-mineral supplements was the only change in diet and treatment.

Brood mares should receive liberal amounts of minerals and vitamins in their feed. Frequently, especially during the periods of shortage of green pasture and winter months, Thoroughbred brood mares are as subject to this type of deficiency as horses in training. They may even be subject to a greater deficiency owing to the fact that the roughage and grain rations fed on many farms are often of low food value.

The brood mares in our study that received vitamin-mineral supplements showed marked improvement in general condition. In one instance, a saddle-bred mare gave birth to twins at full term. The foals were small but otherwise normal and healthy. On previous occasions when this mare was nursing a foal she lost flesh and was not up to the average in milk production. This year, with the arrival of the twins, her diet was liberally supplemented with vitamins and minerals. She remained in excellent flesh and has produced ample milk. The foals, having learned to take this additional supplement in their diet, are in the best of condition and are developing into good colts.

Other brood mares that received similar supplementation to the diet have done exceptionally well. It is believed that vitamin supplements are of great value for this class of Thoroughbred. An early examination for pregnancy in a small group of mares that received vitamin-mineral supplements in their diet revealed that they were apparently over 90 per cent in foal.

Fitch and Boyd and their coworkers[10, 11] at the Minnesota Agricultural Experiment Station reported at length on the effect of low calcium ration on reproduction in cattle. The writer believes that added calcium and vitamins which have been proved essential to assimilation are of great importance in regulating reproduction in Thoroughbreds.

For several years we have advocated that wheat germ meal be added to the diet of brood mares, especially those that are barren. This product is rich in vitamin E. In

Saddle mare Una Woodford and her 1941 twin foals by Kentucky My Own.

one instance on a large stud farm, about 20 barren mares had a high percentage of ovarian trouble (large cystic ovaries) in the fall of the year at the time of the regular examinations for pregnancy. Several

*Product of U. S. Vitamin Corporation.

[10]Fitch, C. P., Boyd, W. L., Eckles, C. H., Gullickson, T. W., Palmer, L. S. and Kennedy, C.: Report of an Experiment to Determine the Effect of a Low Calcium Ration on Reproduction in Cattle, Cornell Veterinarian, xxii (1932), p. 156.

[11]Palmer, L. S., Fitch, C. P., Guillickson, T. W. and Boyd, W. L.: Supplementary Report of an Experiment to Determine the Effect of a Low Calcium Ration on Reproduction in Cattle, Cornell Veterinarian, xxv (1935), p. 229.

mares were operated upon in an effort to relieve the trouble. In December, wheat germ meal was added to the diet of all brood mares on the farm. At the beginning of the breeding season when a thorough check up of all barren mares was made, it was found that in a large majority of them the ovaries had become normal, and that the percentage of pregnancies was high. It is believed that the vitamins contained in the wheat germ meal were an important factor in obtaining these results.

SKELETAL UNSOUNDNESS INCREASING

Foals at foot soon learn to eat grain and roughage. While they undoubtedly receive liberal quantities of vitamins and minerals when nursing, supplementation of the diet with these substances produces satisfactory results.

Like people, horses may seem to be in excellent condition and in good health, and yet have brittle bones, soft bones, buckshins and fractures of the os pedis, obviously due to a vitamin-mineral deficiency. Horsemen complain more and more every year about skeletal unsoundness. The first 18 to 24 months of a Thoroughbred's life are the most important. During this period the foundation for health and performance is laid. In looking into the future, brood mares, foals, weanlings, yearlings and young horses should receive a more liberal supply of vitamins and minerals in their diet so that some of these skeletal diseases might be prevented.

During the past five years the writer has studied the sugar-calcium-phosphorus content of the blood serum of 116 horses. Most of them in training showed evidence of fatigue, low vitality and skeletal diseases which are conditions inimical to good performance.

Dukes,[12] Errington,[13] Kintner,[14] Craig and Gadd[8] and others have made record of the calcium-phosphorus content of blood serum in horses. Their average is recorded in table 1.

TABLE 1

	No. Tested	Sugar	Calcium	Phosphorus	Ratio P-Ca
Dukes	...	85.0	12.0	3.2	1-3.7
Errington	98	....	12.6	3.5	1-3.6
Kintner	69	92.0	11.9	4.0	1-2.9
Craig and Gadd	187	....	12.2	3.5	1-3.4
Way	116	69.5	8.8	3.5	1-2.5

In the 116 cases we studied from March 1937 to May 1941, the average result is shown in table 2.

These analyses were made in the same laboratory and determinations were by the same method. The Folin method for sugar, the Fiske method for phosphorus and the Clark method for calcium described in Kolmer's Clinical Pathology were employed in making the determinations for these respective ingredients.

The relatively low sugar and calcium in the blood serum of Thoroughbred horses in training is significant. The extreme exertion and nervous tension to which Thoroughbreds are subjected require an excess of sugar which is the vital food element or fuel supply. Calcium absorption is low. Vitamin D is essential for calcium metabolism. A calcium-phosphorus imbalance is definitely harmful. Undoubtedly, a defi-

TABLE 2

	Mg. per 100 cc. Blood Serum		
	Average	High	Low
Sugar.....	69.5	120.0*	38.0
Calcium	8.8	12.0	7.0
Phosphorus	3.5	4.8	2.5
Ratio P-Ca	1-2.5		

*In only four cases was the sugar content above 100 mg. per 100 cc. of blood serum (one was 120 and three exactly 100).

[12]Dukes, H. H.: The Physiology of Domestic Animals (1937).

[13]Errington, B. J.: Variations in Inorganic Phosphorus and Calcium Content of the Blood of Horses, Cornell Veterinarian, xxvii (1937), pp. 1-13.

[14]Kintner, Lt. Col. John H.: The Calcium-Phosphorus Ratio in the Ration of the Horse, Vet. Med., xxxv (1940), p. 11.

ciency of vitamin D and calcium in the diet of the average Thoroughbred in training is detrimental. Charles F. Nelson, M. D., and Roland C. Nelson, M. D., of Beverly Hills, Calif.,[15] state that the ratio of P-Ca in the blood of man is normal at 1:3. In horses, Kintner[14] gives an average of 11.9 mg. of calcium and 4 mg. of phosphorus per 100 cc. of serum, which of course is approximately 1:3. Obviously, the average of 1:2.5 in our 116 samples (table 1) is a marked imbalance, approximately a 16 per cent deficiency in calcium from the normal average. When the proper sugar-calcium-phosphorus balance was restored, there was a definite improvement in condition and performance. A multiple vitamin-mineral supplement that is heavily fortified with these essential substances and added to the diet of horses in training is of definite value. During the past few years we have heard a great deal about "better living through chemistry." To paraphrase this popular slogan, we suggest that it is entirely possible to have better Thoroughbreds through chemistry.

ACKNOWLEDGMENTS

The writer wishes to acknowledge the assistance of Dr. Louis Freedman, director of research, U. S. Vitamin Corporation, for valuable suggestions regarding vitamin therapy and in supplying references, and the company for furnishing products used in the trials; also of a group of owners and trainers of Thoroughbreds, who prefer to have their names withheld, for their coöperation in carrying out the feeding experiments.

A dispatch to the *New York Herald Tribune* quoted for the USDA news service, declares that the German conquerors of France have so reduced the food supply of Paris that much of the population of that proud city subsists mainly on yellow carrots. Some cases of actual starvation are reported.

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[15]Nelson, Charles F., M. D., and Nelson, Roland C., M. D.: The Medical Management of Fractures, J.A.M.A., cxvi (1941), p. 184.

Serum Producers' "Food for Victory" Effort

Livestock conservation to aid in the nation's "food for victory" campaign and the rôle which the veterinarian will play in the fight against livestock losses are being stressed in the current spring campaign of the American Foundation for Animal Health.

Through the farm press, the radio, and nearly 1,400 newspapers in principal livestock states, the campaign by the Foundation is centering farmers' attention on such subjects as:

Saving this spring's pig crop, including the importance of obtaining skilled veterinary assistance in fighting hog cholera, erysipelas, enteritis, and other major diseases.

Increasing the nation's dairy products output by combating Bang's disease, mastitis, and other cattle maladies.

The importance of increased watchfulness against poultry diseases, due to this year's larger flocks and the larger percentage of old birds held over from last season.

Conserving the nation's limited horse population through eradicating bots and other internal parasites, vaccination against encephalomyelitis, and better care of horses when the heavy work season arrives.

The campaign of education will continue throughout the year, and will center its efforts on warning farmers of the dangers of livestock diseases and the importance of obtaining prompt diagnosis by a veterinarian in all cases of livestock illness.

The effort is being underwritten again this year by members of the Associated Serum Producers.

"Encephalomyelitis" Versus "Encephalitis"

In referring to certain neurotropic infections of which equine encephalomyelitis is an example it seems proper to shorten the word to plain "encephalitis," and thus conform to the usage of the medical authors. There is no longer any doubt as to the cross infection of certain encephalitides between man and animals and the interchangeable types in question are called plain encephalitis in medical literature. The insertion of "myel" is not thought necessary. The brain not the cord is the main focus of infection.

A Case of Listerellosis in Chickens and an Additional Case in Sheep*

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Sacramento, Calif.

IN MARCH 1941, one of us[1] reported a case of listerellosis in sheep. A case in man was reported previously by Schultz *et al.*[2, 3] This is the report of a case in a chicken and an additional case in sheep.

Organisms of the genus Listerella (= Listeria) have been reported in man and in several species of domestic animals. Seastone[4] studied an organism isolated by Ten Broeck from chickens, 1935. Since that time other cases have been reported in chickens from the Eastern part of the United States and elsewhere.

Ac 428-1941 Chicken.—On March 17, 1941, a hen was received at the laboratory for examination. This bird was dead when it arrived and without any report on the symptoms.

This bird, together with 25 other pullets of a similar age had been shipped to California from one of the New England states on or about October 1, 1940. On arrival, this pen of birds was placed in a well isolated pen, screened against insects. The floor was of concrete and the birds had no access to the ground. There had been no losses in this pen prior to the death of this bird. Another bird died in July, 1941. A diagnosis of adenocarcinoma was made by the University of California.

In September, 1941, the remaining birds were bled and an agglutination test was made on their sera using an antigen prepared from 428-1941. The serum of one of these birds agglutinated this antigen in a dilution of 1/25 but gave negative results in higher dilutions. The results with the remaining 23 birds were negative. Unfortunately these birds were not available for further study.

The autopsy on the hen, Ac 428-1941, revealed an enlarged liver which was studded with tumor-like masses. The ovary contained several large tumors. The spleen was greatly enlarged. The kidneys were pale gray and studded with small whitish areas. Lesions in the heart were not observed. Listerellosis was not suspected until one of us, Lenarz, observed the resemblance of the cultures to those examined in previous cases of listerellosis in sheep. Sections of the neoplasms in the liver and a portion of the spleen were sent to Dr. K. B. De Ome, University of California, for microscopical examination. He reported visceral lymphomatosis.

Cultures from the liver yielded a good growth of fine transparent colonies. The organisms were gram positive and actively motile. Acid was formed in dextrose, maltose, lactose, sucrose, dextrine and levulose. Mannite, raffinose, xylose, galactose, arabinose, inulin and dulcite were not fermented. Gelatine was not liquefied and hydrogen sulfide was not produced. A series of animal inoculations were made with this culture. The results of these inoculations are presented in table 1.

Chickens 2 and 3, (table 2) each approximately 10 weeks old, were inoculated serially with broth cultures of Ac 428-1941, in an attempt to produce the lesions described for this infection. The injections on these birds were made at weekly intervals from 9-6-41 to 9-22-41 as follows: chicken 2 received 1/20 cc., 1/20 cc. and ½ cc., and chickens 3 received 1/10 cc., 1/10 cc. and 1 cc. subcutaneously. On 10-3-41 each bird was injected intravenously with 1 cc. of broth culture. Chickens 2 and 3 were bled from the heart 10-14-41 and destroyed for

*From the Division of Animal Industry, California State Department of Agriculture.
†Resigned October 17, 1941.

[1]Hoffman, H. A., Observations on a case of Listerellosis in Sheep. Jour. A.V.M.A. xcviii (1941), p. 234.

[2]Schultz, E. W., Terry, M. C., Brice, A. T., Jr., and Gebhardt, L. P., Bacteriological observations on a case of meningo-encephalitis. Proc. Soc. Exper. Biol. and Med. xxxi (1934), pp. 1021-1023.

[3]*Ibid.* Listerella monocytogenes. A cause of meningo-encephalitis in man. Proc. Soc. Exper. Biol. and Med. xxxviii (1938), pp. 605-608.

[4]Seastone, C. V., Pathogenic organisms of the genus Listerella. Jour. Exp. Med. lvii (1935), pp. 202-212.

TABLE I—Animal Inoculations

DATE	ANIMAL	DOSE	METHOD INOCULATION	RESULTS
3-26-41	Mouse 1	0.5 cc.	Intraperitoneally	Dead 3-27-41. Cultures fine blue colonies gram-positive rods
3-26-41	Mouse 2	0.5 cc.	Intraperitoneally	Dead 3-28-41. Smear, liver surface. Gram-positive rods. Cultures typical in appearance
3-26-41	Chicken 1	1.0 cc.	Intravenously	No reaction
6-11-41	Mouse 3	0.1 cc.	Intraperitoneally	Dead 6-12-41. Cultures typical in appearance, gram-positive rods
6-11-41	Mouse 4	0.1 cc.	Intraperitoneally	Dead 6-12-41. Culture typical in appearance, gram-positive rods

autopsy. Macroscopic lesions were not seen in any of the internal organs.

Ac 140-1941, Sheep.—On February 5, 1941, two ewes, nine months old, were brought to the laboratory from Clay, California. These animals were in a band of 300 purchased from Colusa, California, in October, 1940. According to information furnished the owner, these animals had been purchased in Utah in September of the same year. These were added to another band purchased from Utah making a total of 1,500. Following the removal of these animals to Clay, two died prior to February 3, 1941. The owner had not observed symptoms of any type. On February 3 and 4, respectively, two animals sickened and died. The owner reported that they ran into objects and ran in circles. He suspected blindness. Two additional ewes sickened and were brought for autopsy. A total of 25 animals died.

Because of the lack of facilities for liberating animals for observation, we were unable to examine the movements of these subjects. The eyeballs were turned down-

TABLE 2

SERUM		ANTIGEN		DILUTION OF SERA					
AC NO.	ANIMAL IMMUNIZED	AC NO.	ORIGINAL HOST	1-25	1-50	1-100	1-200	1-400	1-800
428—1941	Chicken 2	428—1941	Chicken	+	+	+	I	—	—
428—1941	Chicken 2	140—1941	Sheep	+	+	+	+	—	—
428—1941	Chicken 2	381—1940	Sheep	+	+	+	I	0	0
428—1941	Chicken 3	428—1941	Chicken	+	+	+	+	+	—
428—1941	Chicken 3	140—1941	Sheep	+	+	+	+	+	+
428—1941	Chicken 3	381—1940	Sheep	+	+	I	I	0	0
428—1941	Rabbit	428—1941	Chicken	+	+	+	+	I	I
428—1941	Rabbit	140—1941	Sheep	+	+	+	+	+	+
428—1941	Rabbit	381—1940	Sheep	+	+	+	I	0	0
140—1941	Chicken 4	140—1941	Sheep	+	+	+	—	—	—
140—1941	Chicken 4	428—1941	Chicken	+	+	+	I	—	—
140—1941	Chicken 4	381—1940	Sheep	+	+	+	—	0	0
140—1941	Chicken 5	140—1941	Sheep	+	+	+	+	I	—
140—1941	Chicken 5	428—1941	Chicken	+	+	+	+	—	—
140—1941	Chicken 5	381—1940	Sheep	+	+	+	I	0	0
140—1941	Rabbit	140—1941	Sheep	+	+	+	+	+	I
140—1941	Rabbit	428—1941	Chicken	+	+	+	+	—	—
140—1941	Rabbit	381—1940	Sheep	+	+	+	I	0	0
381—1940	Rabbit	381—1940	Sheep	+	+	+	+	0	0
381—1940	Rabbit	428—1941	Chicken	+	+	+	+	+	+
381—1940	Rabbit	140—1941	Sheep	+	+	+	+	+	+

\+ Complete agglutination. — No agglutination.
I Incomplete agglutination. 0 No test.

ward and one had a copious nasal discharge. Cell counts of the spinal fluid revealed 5,765 per cc. and 6,300 per cc. respectively.

The animals were destroyed and autopsied. The autopsies failed to reveal recognizable lesions of any type. The brains were removed and various portions macerated in a mortar for the purpose of making cultures and for animal inoculation.

Cultures of the macerated brain onto beef-infusion agar yielded a liberal growth of bluish, transparent colonies approximately 1 mm. in diameter. These organisms were gram-positive, motile rods. Two rabbits were inoculated subdurally, 2-5-41, with brain material emulsified in physiological saline. Rabbit 1 died 2-8-41 and rabbit 2 showed definite symptoms and was destroyed the same day. Cultures similar in appearance to those obtained from the sheep were recovered from both rabbits.

Two chickens, 4 and 5, approximately 10 weeks old, were injected with culture from Ac 140-1941 in the manner previously described for chickens 2 and 3. These birds were bled for serological studies and destroyed for autopsy. The autopsies failed to reveal macroscopical lesions.

Serological tests.—Rabbits were injected intravenously at weekly intervals with formalized cultures of Ac 428-1941 and 140-1941 respectively. A formalized culture of Ac 381-1940[1] was injected in a like manner into a third rabbit. The results of the agglutination tests with these serums and with serums from chickens 2, 3, 4 and 5 are recorded in table 2. The antigens used in these tests were prepared from formalized agar cultures. The turbidity was approximately that of McFarland tube No. 1. The agglutination tests were incubated 20 hours at 37.5 C. and were read after 24 hours and again after 48 hours.

SUMMARY

An organism of the genus Listerella was isolated from a hen. This bird was affected with lymphomatosis. Because of this complication, it is not possible to determine to what extent the Listerella infection contributed toward the death of the bird. The culture was fatal for mice but failed to kill chickens in doses of 1.0 cc. intravenously.

Another organism of the same genus was isolated from a sheep. Emulsified brain material injected subdurally was fatal for one rabbit and produced definite symptoms in another. This culture was not fatal for chickens in doses of 1.0 cc. intravenously.

Agglutination tests demonstrate a serological relationship of these organisms. A similar relationship with a strain isolated previously from a sheep was demonstrated.

Shortage of Vitamin A

The U. S. Department of Agriculture announces that manufacturers of livestock feeds are facing an immediate, temporary shortage of vitamin A, but that many manufacturers can reduce the amount of this vitamin in their feeds far below present levels and still provide sufficient vitamin A for good nutrition. It is estimated that approximately half the commercial feeds on the market contain at least 50 per cent more vitamin A than the minimum required for good nutrition.

The War Production Board has prohibited the use of high potency vitamin A fish and fish liver oils and restricted use of low potency fish sources of this vitamin in livestock feeds because the war has cut off some of our supplies, and because England needs large quantities of vitamin A concentrate for human consumption.

Specialists of the Department point out that alfalfa leaf meal is the chief farm-grown source of vitamin A, aside from yellow corn, but that there was not enough alfalfa of high vitamin A potency made into meal last year to meet present feed requirements now that restrictions have been placed on fish and fish liver oils.—*USDA.*

A test house erected in Panama by the USDA for the purpose of computing the destructive action of termites was devoured within a year while one built of treated material repelled termite attack.

The Incidence of Right and Left Horn Pregnancies in Dairy and Beef Cattle

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DURING THE COURSE of routine postmortem inspection of cattle in the rôle of federal meat inspector at large packing houses, one has occasion to see 100 animals per hour. These animals lend themselves to statistical studies.

Since but little was ever reported on the incidence of right and left horn pregnancies in cattle, I thought it would be interesting to make such a study and tabulate the results as a record for future reference. Two systematic studies were undertaken. The first comprised 1,182 pregnant uteri of which 651 were from dairy cows and 531 from beef breeds.

Table 1—Results of the First Study

Type	No. of Animals	Right Horn	Left Horn	Twins
Dairy	651	445	199	7
Beef	531	262	265	4

In the second study, 2,642 uteri were examined. These were in 855 dairy cows and 1,787 beef cattle.

The results of both studies show two right horn pregnancies to each one in the left horn in dairy cows while in beef cattle they were about equal. While making the first study it seemed that cattle in poor condition showed a higher ratio of right to left horn pregnancies than cattle in better condition. This seemed to account for the greater incidence in dairy cows but this conclusion was not at all obvious in the second series of observations where, in both studies, the ratio was 2 : 1 in the dairy cows and 1 : 1 in the beef breeds. The incidence of twins in the two groups seems to vary also, as will be seen in table 3.

Table 2—Results of Second Study

Type	No. of Animals	Right Horn	Left Horn	Twins
Dairy	855	570	275	10
Beef	1,787	916	856	15

Where the difference seen in table 3 is significant I do not know. Obviously, a larger number of observations may be needed before definite conclusions can be drawn.

In the first study, all of the twins were bicornual, and in all of them there was a corpus luteum in each of the pregnant horns. In the second study, of the 10 twins

Table 3—Twin Pregnancies Ratios

	Dairy	Beef
1st Study	1 in 93	1 in 133
2nd Study	1 in 85	1 in 119
Average	1 in 89	1 in 126

*Meat inspector on the force of the United States Bureau of Animal Industry in Chicago.

of the dairy cows, 2 sets of twins were unilateral—one left and one right. The other 8 were bilateral. Of the 15 twins in the beef breeds, 3 were unilateral and in the right horn and the remaining 12 were bilateral. In all but one of these twins there was a corpus luteum in each of the pregnant horns. The one exception was a beef-cow with bilaterally pregnant uterus and but one corpus luteum located in the left ovary. The right ovary was fibrous and apparently inactive. In all of the bilateral pregnancies only one corpus luteum was present and it was located on the pregnant side.

Interesting Sideline Cases

In all of the cases studied only one was found where the corpus luteum was in the left ovary and the fetus in the right horn. Both horns were enlarged equally.

Four mummified fetuses were found and in all of them the corpus luteum was lighter in color than normally. In one of these there was but one fetus and two corpora lutea in the ovary of the gravid side. This ovary was cystic also.

Summary

1. Two separate studies were made of pregnant uteri on the postmortem table. The total was 3,824 of which 1,506 were from dairy cattle and 2,318 from beef breeds.

2. In the dairy group, the ratio of right to left pregnancies was 2 : 1 and in the beef breeds approximately equal.

3. There was one pair of twins to every 89 pregnancies in the dairy groups and one in every 126 for the beef cattle.

4. Of the 17 twin pregnancies in both of the dairy groups studied, 15 were bilateral and 2 unilateral. In the beef breeds 16 of the twins were bilateral and 3 unilateral.

Because of confusing nicotinic acid with nicotine the National Research Council recommends the acceptance of "niacin" for nicotinic acid and "niacin amide" for nicotinic acid amide. C. A. Elvehjem, University of Wisconsin, was a member of the committee which made the recommendation.

Glaucoma in Dogs*

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Discussing the operative technics for glaucoma, it seems necessary to review the anatomy of the interior and posterior chambers. The anterior chamber is that cavity lying anterior to the iris and the anterior face of the crystalline lens. Of course, it is bounded anteriorly by the cornea. This chamber is many times larger than the posterior one, which is but a small, triangular space that on cross section of the eyeball from top to bottom through the middle, is seen to be bounded anteriorly by the posterior face of the iris, a small part of the anterior face of the lens which forms the base of the triangle, and posteriorly by the ciliary processes.

As this is rather an involved explanation, I wish to point out that both the anterior and posterior chambers are anterior to the lens and its capsule. These details are given to overcome the popular impression that the anterior chamber is all that part of the eye anterior to the lens and that the posterior chamber is the part posterior to the lens known properly as the vitreous body. The vitreous body is not the posterior chamber.

The cause of glaucoma is not known, but the name "dropsy of the eyeball" seems to explain its nature. In other words, glaucoma is an excessive accumulation of lymph-like fluid anterior to the lens. The normal flow of the lymph is from the posterior chamber into the anterior chamber through the canals of Schlemm, located at the junction of the iris, cornea and sclera. None of the surfaces in the anterior and posterior chambers absorbs fluid. The function of the canals of Schlemm, therefore, is to conduct the excess humors to the sclera or conjunctiva, which do absorb fluids and hence regulate the ocular pressure by draining off the excess and conducting it to those membranes or to the lymph channels. When the canals of Schlemm become clogged or do not function, there is a col-

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*Read before the Section on Small Animals, 78th annual meeting, AVMA, Indianapolis, Ind., Aug. 13, 1941.

lection of fluids in the anterior and posterior chambers which increases the intraocular pressure, the condition known as glaucoma. Why these ducts become clogged, no one can say positively but my theory is that it is hereditary. This belief is founded upon the fact that all of the offspring of a certain stud dog in my practice which lived to maturity developed glaucoma.

Diagnosis.—In lieu of a highly technical examination by a trained ophthalmologist, there are three points which, if established, will confirm a diagnosis of glaucoma.

First, the normal tension determined by pressure with the finger, is similar to that of the ordinary gelatin worm capsules, while in a glaucoma the tension is so increased that the eyeball feels as hard as an apple. Second, the iris is widely dilated and drawn back into convoluting folds. Third, the eye is larger than normal, sometimes as large as a golf or billiard ball, depending upon the size of the dog. The cornea is blue due to the irritation and excessive lymph.

For the relief of glaucoma there are four operations. First, with a scleratome (a triangular spade-like instrument, sharp on both edges and pointed), an opening is made through the conjunctiva and sclera about one-eighth of an inch back of the corneal margin into the anterior chamber. Through this opening the iris is grasped with iridectomy forceps, and pulled out through the opening as far as the strength of the iris will permit without tearing and a triangular area is snipped off. The remnant is allowed to slide back into position. Through this incision in the iris the fluids pass back and forth between the two chambers more freely. In cases diagnosed early, this operation is helpful. The lids are stitched together in this operation and subsequent operations for a period of six to ten days.

Second, the procedure is the same as the first with the exception that when the iris is pulled through the wound, instead of its being cut off, it is cut into two flaps one of which is pushed to the right and the other to the left between the conjunctiva and the sclera. In many cases, these two flaps will stay in position between the sclera and the conjunctiva of their own accord. However, in closing the wound with OOOO catgut, it is well to include the free edge of the iris and thus fix the iris. In this way artificial canals of Schlemm are created; that is, there is now an opening through which the fluids can communicate with an absorbing membrane.

Third, in all chronic cases where the eye is greatly increased in size and the pressure has almost reached the bursting point, a practically certain cure is removal of the lens. This is done by making an incision about one-eighth of an inch back from the cornea through the conjunctiva and sclera into the anterior chamber. Through this incision the iridectomy forceps are inserted so as to grasp the capsule of the lens, which has the consistency of jelly and is not organized and hardened as in cataracts. It is, therefore, necessary to put pressure on the lower edge of the lens and its capsule by means of an ordinary operating hook at the same time that the capsule is grasped and pulled through the opening. In other words, one pulls with the forceps and pushes with the hook applied at the under surface of the lens through pressure exerted on the cornea. It is well to cover the cornea with sterile mineral oil and dip the round hook in mineral oil in order to avoid unnecessary injury to the cornea.

Fourth, a certain cure is the removal of the eyeball. This may sound somewhat absurd but in cases where only one eye is involved and the other eye is apparently normal, Dr. Cashell and I have found that if the affected eye is removed, the other eye will not become affected in a large percentage of cases.

In these operations antiseptic precautions and anesthesia must, of course, be observed. It is sometimes helpful, after the animal is asleep, to desensitize the eye with a 1 per cent butyn solution because the eye retains its mobility in many cases under the deepest anesthesia one may induce. Nembutal is the anesthetic used.

In some cases, where the intraocular pressure is great, the use of 1 per cent eserine salicylate in an ointment base applied

Hypertrophic Pulmonary Osteoarthropathy Associated with a Bronchiogenic Giant Cell Tumor in the Left Lung of a Dog

PHILIP P. POLEY, D.V.M., and J. SPOTTISWOOD TAYLOR, M.D.
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IN ANCIENT MEDICAL writings clubbing of the fingers is often mentioned. Hippocrates clearly associated that change with purulent, pleural effusions. It was not, however, until 1889 when Von Bamberger described general thickening and scleroses of the long bones, associated with clubbing of the fingers, occurring late in the course of two severe cases of bronchiectasis, that the subject attracted attention in modern times. Marie in 1890 published similar observations and considered the condition always secondary to some primary disease, chiefly of the lungs. He suggested the name "hypertrophic pulmonary osteoarthropathy" which is now used almost universally to designate these morbid changes. That this condition occurs in dogs is now well known but no previous observations have been reported in the English language, yet some reports have been published by Italian and French authors. In an exhaustive search of the literature we find hypertrophic pulmonary osteoarthropathy has been reported in dogs, sheep and lions and without exception has been associated with chronic pulmonary tuberculosis. We believe this is the first case of the kind associated with a neoplasm in the lung of a dog to be reported.

Hypertrophic pulmonary osteoarthropathy is characterized by subperiosteal proliferation with the laying down of bone between the elevated periosteum and the cortical portion of the bones involved. There is an associated swelling of the subcutaneous tissues and thickening of the joint capsules and some hydrarthrosis. These result in palpable enlargements of the shafts of the bones and stiffness of the joints. Most frequently little or no pain is experienced. There is a rarefaction of the original bone and trabeculae of the marrow cavities. No lengthening of the bones seems to result, nor are there deformities of the original shaft. Practically always the pathological alterations are bilaterally symmetrical, even though they be more marked on one side. Upper and lower extremities often are involved, but the changes are more extensive and more frequently seen at the lower ends of the bones of the forearms and legs. In a large percentage of cases there is also clubbing of the fingers and toes. Occasionally, simliar changes may occur in the other bones of the body, including those of the skull, jaws and spine.

THE CASE REPORT

Case History.—A liver and white male Pointer whose puppyhood was normal, as was true of his litter-mates, had been fed an apparently adequate supply of minerals, vitamins and other foodstuffs. He was given a Laidlaw-Dunkin distemper immunization and except for several worm treatments was well until, at the age of two years, he developed a dry cough. The cough was infrequent, did not interfere with his hunting nor incapacitate him in any way. In the beginning it appeared during the first few minutes of exercise but soon subsided even when active. He rarely coughed during rest.

Not until 14 months after the onset of the cough did he begin to run lame. Swell-

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(*Continued from preceding page*)

to the cornea lessens the intraocular tension. The application of this ointment every 4 hours for 24 to 48 hours before operating is helpful, and also in cases where the owner will not allow an operation. This ointment contracts the iris and relieves the pressure as long as it is used. However, its continuous use will irritate the mucous membrane and the cornea. Atropine is absolutely contraindicated because the iris is already widely dilated and thrown up in convoluting folds.

ings of both carpal joints appeared and were painful to the touch. Later, similar swellings started in the tarsal joints. Anorexia developed and there was some loss of weight.

Several months before he was first seen by one of us (P.P.P.) he was treated for

Fig. 1. Pointer, showing symmetrical enlargement of forelegs and feet.

arthritis, a diagnosis mutually agreed upon by three veterinarians. Tablets containing organic iodine and dicalcium phosphate plus viosterol were given. The condition did not improve but became worse with swelling of all four limbs.

Symptoms and Diagnosis.—When first examined at the Philip P. Poley Hospital, October 1, 1940, he showed normal growth but was emaciated. He was dull and moved about with difficulty. Flexion of the joints was restricted and he walked stiff-legged. The most noticeable changes were in the long bones of the four limbs. Each leg, including the foot, was much larger than normal in circumference. Palpation of the limbs revealed roughened, hard masses completely surrounding the bones and a moderate amount of subcutaneous edema (figures 1 and 2). There was bilateral conjunctivitis with purulent discharge and photophobia. The temperature was 102.8 F. with pulse and respiratory rates of 80 and 24, respectively. The heart sounds were normal but there was an area of dullness over the posterior half of the dorsal aspect of the left chest. Cough was induced on percussion over the left chest but not on percussion of the right side. The throat and tonsils were normal and the thyroid was not enlarged.

Fluoroscopic examination of the limbs revealed extensive periosteal calcification of all the long bones and of the carpi, tarsi and phalanges. The calcification was bilaterally symmetrical. A similar examination of the chest showed a dense shadow in the lung field above the heart which was estimated to be from 7 to 8 cm. in diameter. This shadow was sharply outlined and did not pulsate.

Laboratory examinations revealed a red cell count of 6,000,000 and the hemoglobin was estimated at 90 per cent (= 15.6 Gm. per 100 cc. equivalent to 100 per cent). The red cells were pale but otherwise seemed normal. There was a leucocytosis of 23,000, of which 88 per cent were polymorphonuclear leucocytes. There were a few eosinophiles and lymphocytes. Albuminuria was present and granular casts were found in the urinary sediment. The blood non-

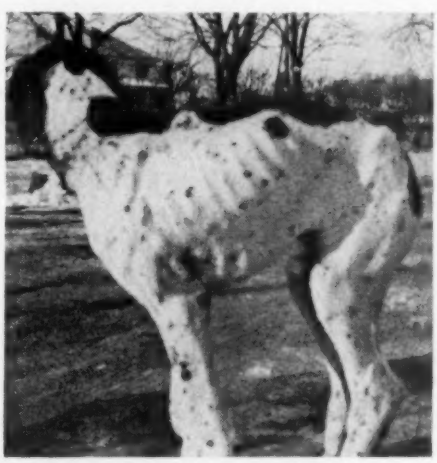

Fig. 2. Side view of dog shown in figure 1, showing symmetrical enlargement of all four legs.

protein nitrogen was 100 mg. per cent while the blood-calcium level was normal. No parasites were found in the stools.

Course and Treatment.—Viosterol and calcium administration was discontinued; 40 grains of sulfanilamide daily and a boric acid eye wash followed by 1:3000 bichlor-

Fig. 3. X-ray of tarsal and metatarsal bones, showing tremendous subperiosteal proliferation of spongy bone. Note that the original cortex is intact.

ide of mercury ointment three times a day were prescribed. The ration was milk and raw meat.

Nine days later marked improvement was noted. He acted brighter, the edema had disappeared and the conjunctivitis had practically cleared up. However, the temperature was 103.2 F., the cough had not improved and the chest findings had not changed.

Facilities were not suitable for obtaining plates of the chest but x-ray films of the bones of the hind legs were made (figure 3) and sent to Dr. G. B. Schnelle, Angell Memorial Animal Hospital, Boston, Mass., who examined them and then had Merrill C. Sosman, M.D., of the Harvard Medical School see them. It was their opinion that the bone changes were those of metastatic carcinoma but they suggested the possibility of pulmonary osteoarthropathy. Sulfanilamide was discontinued and a therapeutic regime consisting of a cough remedy, a tonic, and vitamin B complex was instituted.

One month later the general condition was improved. The eyes were bright and clear, the temperature normal, and the edema had disappeared; yet he was still emaciated, the cough persisted and there was restricted motion of the joints without apparent signs of pain.

Laboratory studies at this time revealed normal red cell count and hemoglobin, a less marked leucocytosis of 17,000 with 78 per cent polymorphonuclear leucocytes and a return of the blood nonprotein nitrogen to normal. No abnormal changes were found in the urine and a blood culture was negative.

An unfavorable prognosis was given the owner. After two more months of observation and treatment he decided to permit resort to euthanasia. Our final antemortem diagnosis was hypertrophic pulmonary osteoarthropathy secondary to some pulmonary lesion.

AUTOPSY

Macroscopic.—The body seemed normally developed but showed great loss of weight. The coat was smooth and shiny with no evidence of skin disease. The most conspicuous findings externally were those involving the long bones of the legs and feet. The legs were enlarged to more than twice their normal diameters from the proximal ends of the humeri and femurs down to the toes but there was no lengthening of them.

On palpation it was observed that the skin was rather tightly adherent to the underlying tissue and bone, where it came in direct contact with the latter. There also appeared to be a loss of elasticity of the subcutaneous tissues, since the skin could not be lifted up into folds or moved from side to side. No pitting edema was present. Palpation of the bones revealed that the diameter was greatly increased in the anteroposterior direction and that the anterior surfaces particularly were roughened and irregular. The consistency everywhere was that of a well calcified bone. An attempt to bend the bones was not successful; instead they were rigid and it was obvious that no bowing had occurred in any of them.

The flat bones, such as the scapulae, those of the pelvis and head as well as the jaw and ribs, showed none of these irregularities. At no place was there apparent a localized enlargement or any change which suggested either a primary tumor of the bone or a metastatic lesion. At the base of the nails, on the dorsal surface, there was a bulging just beneath the skin which had produced a definite widening of the distal ends of the toes, suggestive of that seen in the clubbing of the human digits. There was no exudate over the eyes but the conjunctivae were slightly reddened. No discharge of any sort came from the remaining body orifices and jaundice was not evident.

Before the body was opened we succeeded in obtaining a satisfactory x-ray film of the chest lesion much as it had previously appeared under the fluoroscope (figure 4). The abdominal viscera were in their normal positions and showed nothing remarkable. There was no evidence of chronic passive congestion and no tumor masses could be found. A careful examination of the gastrointestinal tract showed that there was no ulceration and no tumor masses in the mucosa, on the serous surfaces or in the walls. No visible parasites were present in the intestinal contents. The pancreas, spleen and adrenals appeared normal. The kidneys were of normal size and showed nothing more than superficial minute scars in the cortex. The pelves, ureters, bladder and prostate seemed entirely normal. Not the slightest sign of tumor was found in the prostate. The testicles were normal. The diaphragm was in its normal position and its general configuration was not distorted.

The pleural cavities showed no free fluid in them. On palpation, there was found a rather large induration deep in the left

Fig. 4. X-ray of chest, showing dense shadow in the mid-dorsal region of the thorax.

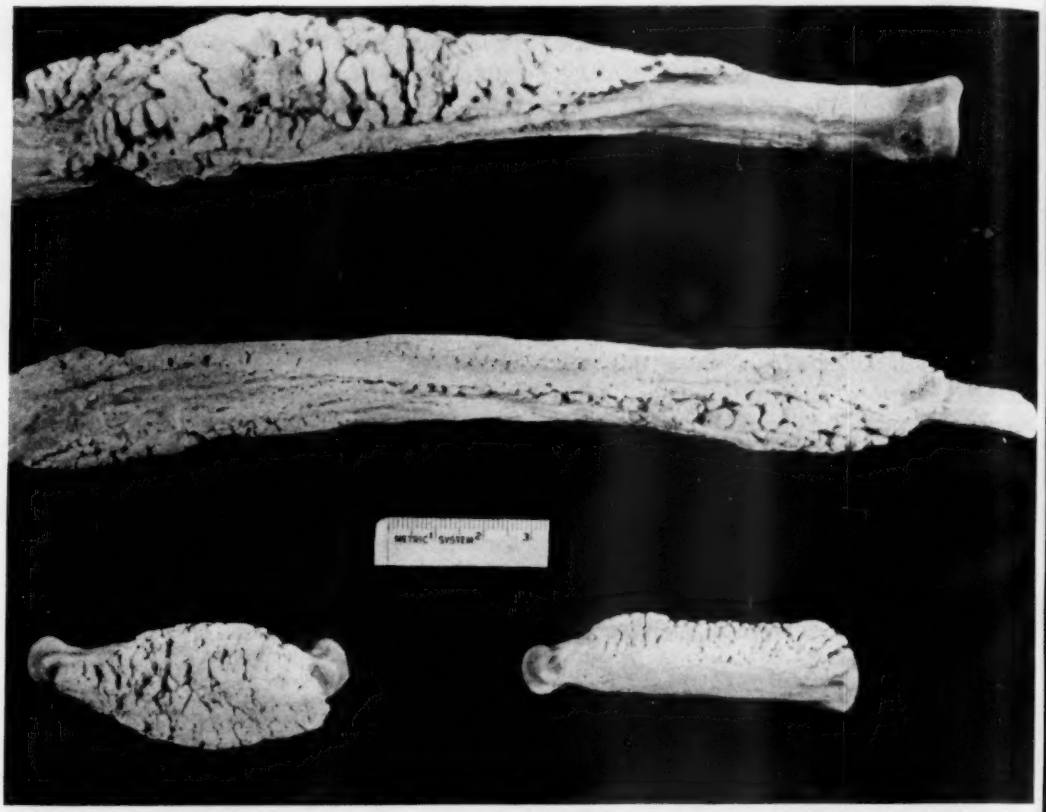

Fig. 5. Long bones of the leg after removal of the soft tissues.

cardiac lobe of the lungs in the vicinity of its bronchus. Throughout this lobe there was an induration and consolidation suggesting pneumonia. Likewise, there was a lobular consolidation of the left diaphragmatic lobe. The right and apical lobes were normal. The heart was of normal size and was bathed by the usual amount of clear fluid. It was not adherent to the pericardium, nor was the pericardium adherent to the lungs. The lymph nodes in the peritracheal and the peribronchial regions were a little large, rather firm, but not matted together and showed no evidence of softening.

When the lungs were removed and sectioned, a sharply circumscribed and apparently encapsulated tumor mass between 5 and 6 cm. in its greatest dimension was found in the left lung. This tumor lay in the wall of the bronchus leading to the left cardiac lobe, and it had constricted the bronchus so that it was difficult to trace a passage into the corresponding lobe. Once the passage was found it was seen that the bronchus was not obliterated, but that the lumen was so compressed that free passage of air and secretions had been prevented. Moreover, the tumor had compressed, to a narrow slit, the bronchus going to the diaphragmatic lobe. It was clear, however, that the obstruction was not so great as in the left cardiac lobe. The mucosa of the entire bronchial tree was intact and had not been ulcerated by the encroachment of the tumor. On detailed examination of that portion of the bronchial tree in the left cardiac lobe it was found that the radicals were somewhat widened and contained mucopurulent exudate. The parenchyma of this lobe was consolidated and the changes were quite uniform. The rubbery consistency indicated a long-standing inflammatory reaction with some organization of the exudate.

Abscesses were not present and there was

no caseation. The changes in the diaphragmatic lobe on this side were similar but not so extensive, nor so far advanced. It seemed clear from the gross examination that the pulmonary changes were the direct result of narrowing and compressing the bronchi to these lobes by the tumor. Sections through this tumor showed it to be well encapsulated with a capsule a millimeter or more in thickness, and at no place was there evidence that the tumor had extended into

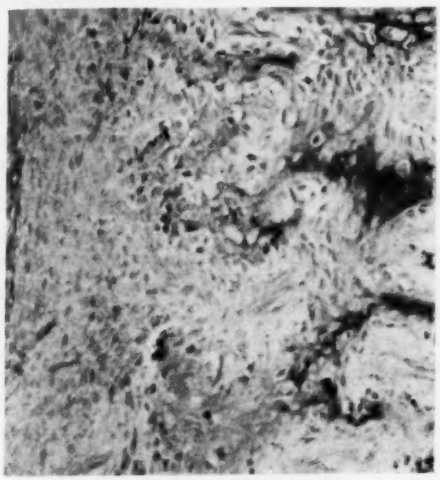

Fig. 6. Periosteum and newly formed spongy bone (x 450).

the capsule or metastasized to the regional lymph nodes. When these slightly enlarged nodes were incised they revealed no evidence of tumor tissue but merely had the appearance of lymph nodes at the site of a prolonged lymphadenitis. The cut surface of the tumor presented a grayish, rather opaque appearance with a tinge of yellow. The tumor tissue was somewhat friable but there was no necrosis. In a few areas, there was some reddish mottling, and throughout interlacing strands of connective tissue. Except for dilation of the right ventricle the heart was normal. No deformity of the ribs or spinal column existed. The thymus gland was not found and the thyroid was normal. No parathyroids were definitely identified and after careful seach not the slightest evidence of a parathyroid tumor was found.

The contour of the head was normal. There were no exostoses or periosteal thickenings either of the flat bones or of the mandible. The teeth were healthy, of good color, and to all appearances normal. When the brain was exposed nothing abnormal was found in the meninges, cerebral hemispheres or basalar structures. The hypophysis was normal but through an oversight the pineal was not examined.

Microscopic. — Microscopic examination of cross sections through the tibia revealed many interesting things. The most striking change was that observed under the periosteum. Here, there was a marked laying down of new bone in such a way that the periosteum was lifted from the original cortical bone and enveloped that which had been newly formed; the plates of new bone formation ran perpendicularly to the shaft of the bone and some of them protruded for a greater distance than the adjacent ones,

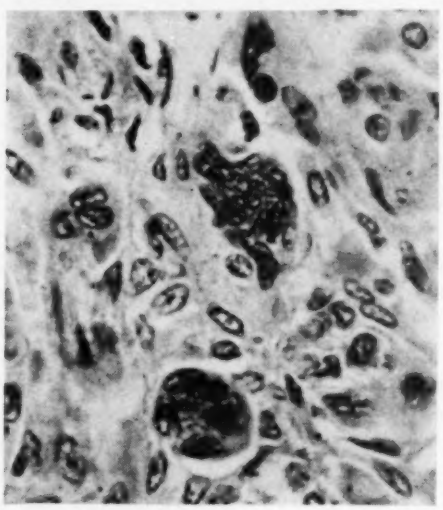

Fig. 7. Representative area of giant-cell tumor in wall of bronchus to left lung (x 920).

thereby producing an irregular periosteal surface. This change is more apparent in the photographs of the bones taken after the removal of the soft tissues from them (figure 5).

There was no significant inflammatory reaction in the newly formed bone, but the marrow spaces between the spicules contained loose vascular tissue in which there was neither fat nor blood forming elements. Examination of many sections showed not

the slightest evidence of osteogenic sarcoma or metastatic tumor of any sort. The periosteum was somewhat thickened but no inflammatory reaction accompanied this thickening (figure 6).

Many sections through the tumor in the lung, including its capsule, revealed an extremely cellular mass in which there was not a great deal of supporting connective tissue. The most striking cell was a large,

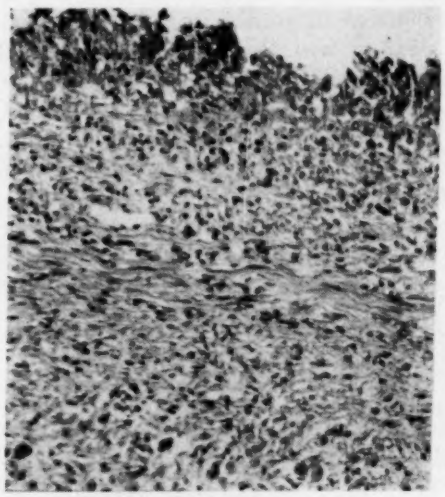

Fig. 8. Section through capsule of tumor.

multinucleated one in which there was an abundance of foamy looking cytoplasm (figure 7). These giant cells were numerous and formed the most conspicuous feature of the microscopic picture. These cells were surrounded by smaller cells which were usually oval, somewhat spindle-shaped and had vesicular nuclei. A few of these polynuclear cells resembled closely the so-called "foam cells" of xanthomata. There was no bone in the tumor and sections revealed no necrosis. On careful study of several areas in the capsule, no invasion of this wall could be demonstrated (figure 8). It was difficult to say, because of the size of the tumor, exactly where it originated, but the fact that the bronchial mucosa was intact indicated that it arose in the wall of the bronchus. The tumor had pressed the lung tissue aside but in no sense had invaded its parenchyma. The histologic appearance of the tumor together with its complete encapsulation in the absence of metastasis led us to believe that this giant cell tumor was benign.

COMMENT

Hypertrophic pulmonary osteoarthropathy, a rather common manifestation of diseases of the heart and lungs in man, has very rarely been reported in animals. All of the reports we have been able to find are in some foreign language. After rather exhaustive search, not a single report has been discovered in English veterinary journals.

Benign giant cell tumor of the bronchus has never been found as the primary disease process in dogs associated with hypertrophic osteoarthropathy. New light has not been thrown upon the etiology of this condition by the findings in our case but the case does demonstrate a benign removable tumor of the bronchus, suggesting perhaps that a pneumonectomy should be attempted in such cases before the affected animals are sacrified.

We believe this disease, when observed clinically in animals, almost universally has gone unrecognized and has been most often mistaken for primary bone tumor, metastatic lesions in the long bones, or osteomyelitis. The changes might conceivably be confused with those found in hyper-parathyroidism.

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Collet, P. et Jolly, Un Cas d'osteopathie hypertrophiante independent de la tuberculose chez le chien, Bul. de la Soc. Sci. Vet., Lyon (1938), xli, pp. 11-21.

Jolly, P., Contribution a l'etude de l'osteopathie hypertrophiante . . . chez les carnivores domestiques, *Thesis*, Lyons, 1937.

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Au Revoir to Our Colleges in Java

Readers of the JOURNAL will miss excellent abstracts from the veterinary literature of the Dutch East Indies supplied from time to time by Charles Haasjes, Shelby, Mich., who gleans material from the literature of our Netherland confrères. These three illustrated abstracts were received before the unthinkable Japanese invasion of that peaceful colonial possession and are published now as a feeble expression of the profound regrets and admiration aroused among American veterinarians by the cruel events of this heart-breaking hour. So, we are saying *au revoir* but not *adieu*. We'll be seeing you, and not perhaps.

Sarcoma of the Right Nasal Cavity

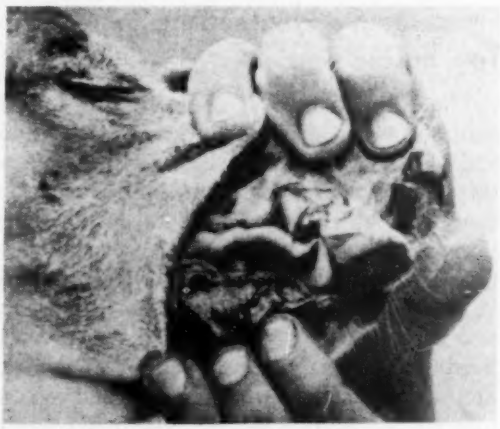
Fig. 1.—This picture is reproduced from the photograph of a dog suffering from

nasal obstruction. The growth was intranasal and although located on the right side, encroached by lateral pressure upon the lumen of the left nasal passage and upon the nasal bones, which as seen in the picture, were bulged upward. The dog had shown a unilateral, bloody discharge from the nostril of the affected side. The growth was identified as a sarcoma by histological examination, *post mortem*, made at the Clinic Department of the Netherland Indian Veterinary College, Buitenzorg, Java. —*From Nederlandsch Indische Bladen voor Diergeneeskunde, liii, No. 2, p. 179.*

* * *

Malignant Osteoma

Fig. 2.—The subject was a dog suffering from a smooth, hard, subgingival tumor around the right maxillary canine tooth. The growth was surgically removed under local anesthesia but it recurred. In two months the growth was as large as a hen's

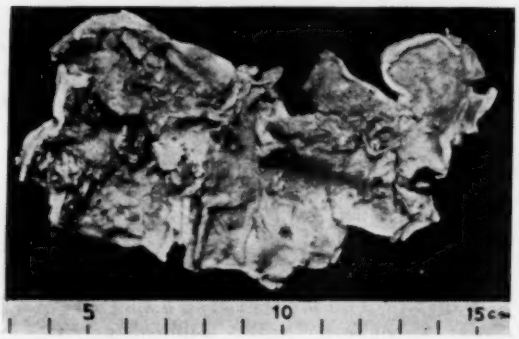


egg. The report was written by Dr. R. Soetisno, district veterinarian, Madioen, Java. Histological diagnosis, osteoma.—*From ibid. p. 177.*

* * *

Aspergillus Fumigatus Infection

Fig. 3.—A rooster suffering from a severe diarrhea for some time known to be infected with *Heterakis perspicillum*, presented on postmortem examination a growth attached to the left testicle. The tumor was 12 x 6 cm. in size, adhered to the surrounding tissues. It was walled with a capsule, 3 mm. thick of greyish white material of a caseous nature which contained concretions. *Aspergillus fumigatus* was isolated within its substance by Prof. D. K. Boedijn who reports that the



A. fumigatus cause serious disease in various species of birds. The infection is fatal in young birds.—*From ibid. Issue not given.*

Fistula of the Frontal Sinus in a Toy Boston Terrier

The subject was a Toy Boston, 2½ years old, suffering from diarrhea, emaciation, and a tiny fistulous opening into the frontal sinus located half an inch from the center of the right orbital fossa, *i. e.* on the interpupillary line. Two months previously, the dog had been snagged with a sharp object. Ten days later the injured area was discharging pus and the discharge had been constant up to the time of my examination. The x-ray picture showed an osteitis an eighth of an inch wide encircling the opening. The patient was given a balanced ration and treated for tapeworms which were found to be present.

Under nembutal anesthesia, the opening was laid bare by a vertical incision and enlarged by curettage, and the adjacent part of the sinus was packed with strips of gauze. The packing was removed in four days. In a week the opening had closed and the discharge had stopped. There was no recurrence of the trouble. Obviously, the lesioned bone encircling the opening was the cause of the chronic fistula.—*H. M. Zweig, D.V.M., Nassau, N. Y.*

New Drug for Shock

S-methyl-iso-thiurea is the chemical name of a new drug employed in the treatment of shock in seriously injured men. Its effects are described by Dr. F. H. Smerk of New Zealand in the *British Medical Journal.* The drug is credited with doubling the systolic pressure for 15 minutes to an hour, pending the blood transfusion required to restore the volume of blood lost by hemorrhage or the peripheral anemia of the seriously shocked patient. The drug differs from shock stimulants in acting directly upon the blood, in lieu of through the nervous system. Since shock treatment with nervines fails because of peripheral sympathetic paralysis, a drug surmounting that barrier may have exceptional value. In itself, the new chemical has no value. It merely carries the victim over until a blood transfusion can be administered.

To Surgically Anesthetize the Udder of Cows for Total Ablation

L. E. St. Clair, department of anatomy, Iowa State College, by means of a meticulous dissection of the nerve supply of the cow's udder, describes the method required to block off that structure for a total ablation (*American Journal of Veterinary Research, Jan. 1942).*

The dissection shows that epidural and pudic (perineal) anesthesia are required. The former must reach as far forward as the first lumbar nerve which furnishes nerve supply to the skin of the anterior part of the udder. To reach the skin of the posterior part and the hind teats, the perineal nerves are blocked by injecting the anesthetic solution just below the vulva on each side of the median raphe. From a study of this classical dissection, it is evident that nothing short of this procedure will do.

Scientists of the College of Agriculture, University of California, are reported to have produced starch artificially by combining glucose, phosphoric acid and a potato enzyme.

The use of sulfa drugs in the abdomen surgically opened is a common practice and a useful one, but the injection of the drugs into the unopened abdomen of patients suffering from peritonitis is a new use for them.

The Use of Transfusions in the Maintenance of Fluid Balance and Blood Volume

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Scott Field, Illinois

UNDER NORMAL conditions the intake of water, salts, and food governed by the sensations of thirst and hunger is sufficient to meet the body needs. The intake of fluid must keep pace with the loss of water and salt from the body. Many factors coöperate to maintain a normal distribution of salts and water in the tissue cells, the extracellular spaces, and the circulating blood. A few of the factors that may be mentioned are: (1) sufficient amount of plasma protein to attract and hold an adequate volume of fluid in the blood stream; (2) selective semi-permeability of the capillary walls which permits flow of water and salts into and out of the blood vessels but withholds most of the protein in the blood stream; and (3) actively functioning adrenal cortex, one of the functions of which is to maintain the tone and permeability of the capillary walls.

Renal activity and other important factors may be mentioned also. Any alteration in any of these factors is reflected in changes in the amount and partition of body fluids which, if allowed to progress, may produce dire results.

BLOOD CHANGES CAUSED BY SEVERE DEHYDRATION AND HEMORRHAGE

The problem of supplying water and salt intravenously to meet current requirements and to replace minor losses of body fluid in the animal which can not or will not take fluids by the mouth is relatively simple. However, when replacement of water and electrolytes fails to keep pace with an excessive loss such as occurs in severe diarrhea the problem is more difficult. When great amounts of water and salt are drawn from the body the blood cells and plasma proteins become more concentrated. With the increase in plasma protein, more of the reserve, extracellular water is drawn into the blood stream.

Because of the blood concentration the normal volume of circulating blood is reduced. When the extracellular fluid has been largely depleted, the capillary walls, injured by the sluggish movement of the concentrated blood, become more permeable to allow plasma protein to escape. Thus, an absolute reduction in blood volume occurs and a state of shock is produced. Moderate loss of whole blood through hemorrhage results in a dilution rather than a concentration of blood cells and plasma protein. Severe, sudden hemorrhage, of course, promptly reduces the blood volume to an amount incompatible with sustained circulation. If moderate losses of whole blood are prolonged, the reduced number of red blood cells becomes inadequate to carry sufficient amounts of oxygen to the tissues, the capillaries become more permeable and their ability to retain fluid in the blood stream is lost.[1, 2]

BLOOD CHANGES CAUSED BY INFLAMMATION

The inflammatory reactions caused by mechanical and chemical injuries, burns, and infections, as well as uncomplicated dehydration and hemorrhage, are common causes of increased permeability of the capillaries. Underhill and Fisk[3] observed that the fluid which exudes from the burn surface is almost identical with blood serum in composition. Beard and Blalock[4]

[1]Moon, V. H.: Hemoconcentration as related to Shock, Am. J. Clin. Path., xi (1941), p. 361.

[2]Minot, A. S. and Blalock, A.: Plasma Loss in Severe Dehydration, Shock and Other Conditions as Related to Therapy, Ann. Surg., cxii (1940), p. 557.

[3]Underhill, F. P., and Fisk, M. E.: Studies on Mechanism of Water Exchange in Animal Organism; Composition of Edema Fluid Resulting from Superficial Burn, Am. J. Physio., xcv (1930), p. 330.

[4]Beard, J. W., and Blalock, A.: Composition of Fluid that Escapes from Blood Stream after Mild

showed that the fluid which escapes from the blood stream following mechanical injury and burns contains the same amount of protein as the blood plasma. From these studies and others it appears that whatever the original cause may be, the resulting damage to the capillaries allows plasma protein, as well as water and salts, to pass out of the blood stream into the tissue spaces. This transfer of plasma leads to a decrease in blood volume and impairment of circulation.

In cases of localized injury, the loss of plasma is mainly into the injured area. Later, neighboring uninjured blood vessels become affected and loss in blood volume may thus seriously increase. Similarly, uncomplicated dehydration may involve no capillary injury at the start but if allowed to continue may secondarily give rise to changes in the capillaries which cause loss of blood plasma.

Correction of Fluid Losses

The main objective to be attained in the replacement of fluids is to restore and maintain a nearly normal blood volume and hence a more effective circulation. In simple dehydration, the intravenous administration of saline and glucose solutions may be sufficient. However, when the losses in body fluids are excessive or if shock is present, or when the past history or present condition of the animal indicates that circulatory collapse or shock is likely to occur, additional measures should be employed. These include means of restoring the tone and normal permeability of the capillaries, and causing the retention of fluid within the blood vessels in addition to saline and glucose infusion solutions. In the sudden, primary neurogenic or anaphylactic type of shock, epinephrine 1:1000 may be of value in increasing vasoconstriction and overcoming the vasodilation present in this type of shock. However, one of the main differentiating characteristics of the type of shock that follows dehydration, hemorrhage, or trauma is vasoconstriction. As shown by Freeman[5] and confirmed by many others, vasoconstriction is a valuable compensatory mechanism in the very early stages, but later it becomes a factor in causing further loss in plasma. Therefore, vasoconstrictor drugs in this latter type of shock contribute to the vicious cycle of events.[2]

More promising by far are the results obtained with adrenal cortex extract. The original suggestions offered by Swingle and his associates[6] that one function of the adrenal cortex hormone is the maintenance of normal tone and semi-permeability of the capillaries has been proved by animal experimentation.[7] Many clinical and experimental observations on the effectiveness of adrenal cortex extract in restoring blood volume and circulation in shock[8,9,10,11] indicate that this extract should always be considered in the prevention and treatment of shock. Adrenal cortex extract, however, should not be used to the exclusion of other treatments. An important part of treatment should still be the replacement of those elements which have been lost from the circulating blood.

Fluid Replacement

Fluid replacement therapy varies with each patient. In an acutely dehydrated animal with a normal concentration of plasma protein and with uninjured capillaries, fluid and electrolyte may be administered in fairly accurately calculated amounts according to size of the individual. The restoration and maintenance of an effective circulating volume of blood where the capillaries are permitting plasma

Trauma to Extremity, after Trauma to Intestines, and after Burns, Arch. Surg. xxii (1931), p. 617.

[5]Freeman, N. E.: Decrease in Blood Volume after Prolonged Hyperactivity of the Sympathetic Nervous System, Am. J. Physio. cili (1933), p. 185.

[6]Swingle, W. W., and others: Function of Adrenal Cortical Hormone and Cause of Death from Adrenal Insufficiency, Science lxxvii (1933), p. 58.

[7]Menkin, V.: Effect of Adrenal Cortex Extract on Capillary Permeability, Am. J. Physio. cxxix (1940), p. 691.

[8]Reed, F. R.: Acute Adrenal Cortex Exhaustion and Its Relation to Shock, Am. J. Surg. xl (1938), p. 514.

[9]Selye, H.; Dosne, C.; Bassett, L., and Whittaker, J.: The Therapeutic Value of Adrenal Cortical Hormones in the Treatment of Shock and Allied Conditions, Canad. M.A.J. xliii (1940), p. 1.

[10]Weil, P. G.; Rose, B., and Browne, J. S. L.: The Reduction of Mortality from Experimental Traumatic Shock with Adrenal Cortical Substances, Canad. M.A.J. lxiii (1940), p. 8.

[11]Hartman, F. A.: The Adrenal Hormones in Medical Practice, J.A.M.A. cxvii (1941), p. 1405.

protein, water and salts to escape, presents a more difficult problem. The intravenous administration of saline and glucose solutions only temporarily increases the circulating volume as they soon pass out of the leaking capillaries. If the plasma protein is already low as in hemorrhage, the further dilution only hastens the escape of fluid from the capillaries and further reduces plasma protein by carrying out more protein. The end result is tissue edema with a dehydrated blood stream.[12] Nevertheless, saline and glucose solutions must be given in amounts sufficient to restore water and electrolyte balance and supply fluid for urine formation and evaporation through the lungs. At the same time adequate transfusions of blood plasma or whole blood must be given in order to replace the other missing blood elements and to hold the aqueous solutions in the circulation.

Blood Plasma Transfusions

In animals whose blood volume is being reduced by loss of plasma and not by hemorrhage, transfusions of blood plasma are preferable to transfusions of whole blood. The use of plasma avoids further burdening of the blood with the blood cells which are already present in high concentration.

Furthermore, plasma transfusions make it possible to introduce plasma protein approximately twice as fast as when whole blood is used.[13] The amount to be given to small animals usually varies between 25 and 100 cc. This amount depends entirely upon the animal's clinical response and the changes in the hemoglobin, the protein content of the blood, and the red blood cell volume and concentration. When blood plasma can not be obtained whole blood transfusions should be employed.

Whole Blood Transfusions

The primary indication for whole blood transfusion is acute hemorrhage and for the treatment of shock caused by it. When blood is lost, plasma protein is needed to overcome the dilution that follows the reduction in blood volume. In addition, red blood cells are needed to supplement the decreased number of cells in circulation in order that the oxygen-carrying functions of the blood may be restored and the deleterious effects of anoxemia prevented. Whole blood transfusions are now more widely used in veterinary medicine. They are of value in increasing resistance to certain infectious diseases because of the contained antibodies. In the correction of plasma protein deficits caused by such conditions as kidney disease and by malnutrition, plasma transfusions are indicated.

Summary

Severe dehydration, inflammatory reactions following mechanical or chemical injuries, burns, infections, hemorrhage, or other conditions may cause the capillaries to become more permeable and permit plasma protein, water and salts to escape from the blood stream. The reduction in blood volume which follows impairs circulation and leads to shock. The restoration of blood volume and maintenance of effective circulation requires replacement of all of the blood elements that have been lost.

Along with the administration of saline and glucose solutions, blood plasma or whole blood transfusions must be given. The plasma protein is an indispensable factor in governing the proper distribution of the administered aqueous infusion solutions in the various fluid reservoirs of the body, and in restoring water and salt balance. Adrenal cortex extract should be administered as supportive treatment in the maintenance of normal tone and semi-permeability of the capillaries.

Roughly speaking, about one-half of the bulk of protein is carbon, one-fifth oxygen, one-sixth nitrogen and about one-fifteenth hydrogen. The rest is sulfur (0.3 to 2.3%) and phosphorus (1.5%).

Over 70 per cent of all chickens raised in the United States come from hatcheries, which is an increase from 30 per cent ten years ago.—*USDA.*

[12] Minot, A. S.: Factors Influencing the Disposition of Fluids Given Intravenously, Am. J. Dis. Child. liv (1937), p. 185.

[13] Blalock, A., and Mason, M. F.: Blood and Blood Substitutes in the Treatment and Prevention of Shock with Particular Reference to Their Uses in Warfare, Ann. Surg. cxiii (1941), p. 657.

CLINICAL DATA

Among the ingredients of the body of animals, the percentage of mineral matter is the most constant. It remains close to 4.5 per cent of the total bulk, but that percentage has to be maintained to maintain health.

An experiment conducted by Miss Edna Higbee of the University of Pittsburgh, showed that weak solutions of colchicine injected into chicken eggs produced chicks with oversized combs and roosters with elongated tail feathers.

There are 22 amino acids, 10 of which must be fed because the body processes can not produce them. The absence of any one of these can stop growth and even life, so the feeding of domestic animals has advanced beyond the mere shoveling of a certain amount of forage into the feedbox.

The amount of salt to put into the drinking water of chicks to cure cannibalism is one teaspoonful to the gallon. If the outbreak is severe, slightly larger amounts may be given, remembering that too much salt is harmful to chicks. Salt may also be given in the mash.—*From Poultry Tribune.*

Our Typhoid Marys

Veterinarians working in Colorado and elsewhere have shown that cattle having no evidence that cattlemen can detect, can be carriers of anaplasmosis, brucellosis and mastitis. In the case of anaplasmosis, as workers in the intermountain country have observed, it is easily transmitted from carriers at the time of dehorning. The moral is to do surgery according to the rules of that art. Dipping the dehorner in a 2 per cent solution of lye after each operation is recommended as a practical means of prevention.

Epsom Salt as a Purgative in Horses*

The stomach tube permits the administration of large doses of sulfate of magnesium in horses affected with obstruction of the large intestine, but it requires 2 to 3 days to dilute the impacted mass and the diarrhea lasts longer and is more abundant than from similar doses of sulfate of sodium. The latter is, however, preferable in horses unless the magnesium salt is given in much smaller doses than currently used. After receiving a purgative dose of sulfate of magnesium, the horse suffers pain and loses weight.

Avian Tuberculosis

In the Middlewest, avian tuberculosis is one of the grave problems of the veterinary service. In a recent after-lunch chat with a federal meat inspector of long-time experience, it was said that the retention of swine for tuberculosis now is about the same as in the days of widespread tuberculous infection of cattle. Besides the cost in money and loss in finished food, tuberculosis of chickens is a greater national menace than is generally supposed, and from the standpoint of eradication, it presents difficulties not easily surmounted.

Ridding a flock of farm poultry of tuberculosis can be accomplished forthwith by killing the whole flock and discontinuing the keeping of poultry for two successive years, it is said. This, in addition to some energetic disinfection accomplishes the purpose, but who in private practice or public service would dare to actually carry out that radical measure, now that accelerating food production is the motive? And, what farmer would coöperate in a step to abolish all income from the poultry flock for that length of time? Tuberculin testing and getting rid of the reactors is faulty, unless

*From Berliner tierarztlische Wochenscrift, reviewed in Revue de Médecine Vétérinaire, xcii (May-June, 1941), p. 141.

the nonreactors are promptly placed in clean quarters not previously occupied by chickens. To carry out this measure, new buildings have to be constructed on clean ground away from the beaten paths of the former flock. By constant vigilance and retests and avoiding the addition of tuberculous replacements, there is the prospect of exterminating tuberculosis from a flock of farm chickens. Step number three is to dispose of all chickens at the end of each laying season, but that measure has no foot to stand on, except that the laying hens, the pullets of the previous year, are dispatched before they have lived long enough to become spreaders of the infection.

Pantothenic Acid in the Nutrition of Pigs

The author proved that pigs fed diets containing sufficient nicotinic acid, thiamin and riboflavin need other factors of the vitamin B complex. The deficiency was pantothentic acid. Five pigs were used. Two, which were fed a basal ration without pantothenic acid (= calcium pantothenate) grew slowly and developed symptoms described in reports from different parts of the country (lameness, goose-stepping, loss of hair, subnormal appetite, emaciation), and *post mortem* showed gastritis and abscesses in the large intestine. The experiment proved that pantothenic acid is necessary to the normal growth and well-being of pigs. [*Highes, E. H.: Pantothenic Acid in the Feeding of Pigs, Journal of Agricultural Research, lxiv (Feb. 1, 1942), pp. 185-187.*]

The Silo in the Food for Freedom Program*

The best way to increase milk production "for the duration" is for farmers to hold on to the cows they have, not to cull herds as would ordinarily be done, and to feed heavier than usual. Less concentrate is needed where roughage is of good quality and fed abundantly. Here the silo plays an important part in the defense program. It not only furnishes storage for grasses and legumes when these are abundant, but also conserves their food values better than in the form of hay. Grass ensilage makes good summer feed and when fed out the silo is ready for the corn crop in the fall. High-moisture crops treated by the addition of molasses, liquid phosphoric acid or corn and corn meal are excellent feed. When thus treated, their protein is not broken down into less valuable nitrogenous compounds and their carotene is preserved better.

Corn, when shocked and fed as grain and fodder, loses a great deal of its carotene and in drying and exposure to the weather the latter loses much of its food value and palatableness.

*Excerpt from an article by O. E. Reed in Hoard's Dairyman.

Blindness from Vitamin A Deficiency in Foxes

By means of an experimental diet deficient in vitamin A, the author was able to produce xerophthalmia and ulceration of the eyeball in the silver fox. Other lesions developing concurrently were epithelial alterations of the bronchi, kidneys, bladder and vagina. The symptoms produced were trembling and cocking of the head, encircling walk and period of coma. The liver was found to contain no detectable amount of vitamin A.

The vixens nursing the pups were fed a diet low in vitamin A as follows: frozen horse muscle, 35%; oatmeal, 7%; toasted white bread crumbs, 7%; bonemeal, 3%; powdered skim milk, 5%; water, 43%. The depleting diet for the pups was: meat scraps (65% protein), 30%; powdered skim milk, 7%; oatmeal, 30%; dried yeast, 5%; bonemeal, 2%; salt mixture, 1%; water, 20%; with supplements of vitamins D and C. From 18 to 27 weeks were required to develop the symptoms described. [*Smith, Sedgwick E., U.S.B.A.I. Vitamin A Deficiency in Silver Foxes. The Fur Journal, vii (June 1941), pp. 3-5.*]

Was Phenothiazine Responsible?

J. H. RIETZ, D.V.M.
Morgantown, W. Va.

Ninety pigs, 8 weeks old were treated with phenothiazine in the fall of 1940. The dose was 6 Gm. per pig, given as a drench.

A few of the pigs showing symptoms of parasitism when 4 to 5 weeks old were treated with phenothiazine. The dose given was 4 Gm.

As the results of the treatment were satisfactory, it was decided to treat all of the 1941 pigs when 4 weeks old and again when 8 weeks old. The pigs were weaned when 8 weeks old and placed in a clean hog house.

Five litters of the 1941 spring pigs, numbering 31 head, were treated when 4 weeks old. The dose was 5 Gm. per pig, administered as a drench. No symptom other than red urine was observed as a result of this treatment.

Then three litters 4 weeks of age, numbering 16 head, were drenched with 5 Gm. of phenothiazine each. The following day the attendant reported that all of these pigs were crazy. Investigation showed that all 16 of them had lost their equipoise and power of coördination in movement. Those that attempted to walk, would move sidewise or more or less in a circle. The feet were thrown too high off the ground. None of the pigs could walk more than a few feet until they would fall. Some were prostrate; the general position of the body was that of opisthotonos. The eyes showed constant spasmodic movement. When held up to the sow's nipples, some of them would nurse.

Excepting two that died, all had recovered within 72 hours and most of them were apparently normal within 48 hours after receiving the treatment.

Autopsy of the two dead pigs failed to disclose any lesions that could be regarded as diagnostic.

The only treatment given was mineral oil and force feeding with milk, either sow's milk by holding the pigs up to the nipples or cow's milk given with a dose syringe.

Seven other litters numbering 41 pigs 4 weeks old were treated by giving 4 Gm. of the phenothiazine to each pig. In this group of 41 pigs, four head showed nervous symptoms and incoördination in movement. All four of these pigs were apparently normal within 48 hours.

All of these pigs when 8 weeks old were weaned, transferred to a clean hog house with connecting lot and drenched with 6 Gm. each of phenothiazine.

After the treatment had been given to 8 litters, 8 weeks old, numbering 45 pigs of the above named group, a severe dermatitis appeared among them. The condition resembled advanced scabies. The skin was scaly, thickened and cracked, and the ears edematous. Examination failed to show any mites. The dermatitis was extensive in 22 of them but all of the 45 were more or less so affected. Seven of the most severely affected ones died.

The autopsies showed a necrotic enteritis of the cecum and colon. The most extensive lesions were in the colon. There were areas in the small intestine and slight congestion of the kidneys. Only a few parasites other than Trichuris were found.

The remaining seven litters, numbering 41 pigs that had been treated with phenothiazine when 4 weeks old, were given a mixture of oil of chenopodium and castor oil at the 8 weeks period instead of the phenothiazine. These pigs were weaned and placed in the same hog house as the 45 older pigs which had developed the dermatitis.

No dermatitis or symptoms of necrotic enteritis appeared in any of this group of 41.

While this is not conclusive evidence, it points accusingly to the phenothiazine as the possible or contributing cause of the nervous disorder, dermatitis, and necrotic enteritis.

Infectious Catarrhal Enteritis of Turkeys: Transmission and Prevention*

This disease, formerly known as trichomoniasis, has been described elsewhere (Hinshaw, McNeil and Kofoid,[1] Hinshaw and McNeil[2]). Our research has shown definitely that the two species of Trichomonas found in the lower intestinal tract of turkeys are not pathogenic and, therefore, the term trichomoniasis should not be applied to this disease. *Hexamita meleagridis*, a protozoan parasite belonging to an entirely different group of organisms, is the causative agent. These facts are of practical importance in diagnosis and control.

H. meleagridis occurs where the disease occurs—in the small intestine. The walls lose their tone and are often thin with bulbous areas. There are no specific symptoms. The poults have no fever; on the contrary the temperature is usually subnormal and the birds seek the warmest parts of the brooder. Diarrhea if present is of a watery, foamy character.

The most susceptible age is 1 to 9 weeks, if there are no complicating factors. If the poults have been through some other disease such as pullorum disease or paratyphoid, they may be susceptible up to 16 weeks. Especial care should be taken in such flocks to avoid sudden changes such as moving and change of food, until they are 12 to 16 weeks of age.

A relatively large number of survivors of an outbreak continue to harbor the parasite in the intestinal tract and in the bursa of Fabricius. Autopsy studies have shown that it frequently localizes in the region of the ileo-rectal opening (cecal tonsils). It is, therefore, impossible to detect all the carriers of the organism by bursal or rectal examination of live birds. Hexamita are shed in the droppings, and it is possible to transmit them directly from adult birds to young poults. Studies have proved that there is a gradual build-up of infection. The birds which receive organisms from a carrier may receive so few that there is no mortality. After further transfers the number of Hexamita are increased to a point of causing heavy mortality. We feel that this fact has not been sufficiently emphasized.

The first age group of poults on a ranch may receive only a few Hexamita from the breeders and show no ill effects, and the owner frequently assumes that they are free from these parasites. Without a microscopic examination, it is impossible to know definitely whether such birds are carriers. One should always consider it probable that if there is an overlap of breeders and poults, he may introduce a few Hexamita in the poults. The older groups should always be considered potential sources of infection and the same precautions taken to segregate younger age groups as when the acute disease is present on the ranch. This may at first seem to involve unnecessary labor, but experience has shown that the later mortality causes much more financial loss and increase of labor than routine precautions.

Prevention.—The primary source of infection is the intestinal contents of carriers. The entire prevention program must be built around the recognition of this fact. Finding a satisfactory method of preventing the transfer of droppings from carriers to young birds is the most efficient method of preventing the disease. No general recommendation as to the best procedure to follow can be given because every ranch requires a separate solution of the problem of eliminating the danger of having carriers on the ranch. Recent work indicates that quail, chukars and ducks may also be

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*A revision of a similar report released June, 1941.

[1]Hinshaw, W. R., E. McNeil, and C. A. Kofoid. The Relationship of Hexamita sp. to an Enteritis of Turkey Poults. Cornell Veterinarian xxviii (1938), pp. 281-293.

[2]Hinshaw, W. R., and E. McNeil. Infectious Catarrhal Enteritis of Turkeys. Turkey Talk, 1 (1939), pp. 5, 7, 21.

carriers. Factors which may aid in solving the individual problems are:

1. Separate units and caretakers for the breeding flock and the young poults.
2. Separate equipment for each age group.
3. Intelligent use of wire platforms for feed and water.
4. Intelligent use of cement yards and wire pens.
5. Feeding and watering equipment arranged so that the attendant need not enter the pens, and kept sanitary at all times.
6. If the poults have undergone an outbreak of pullorum disease or paratyphoid, avoid changes in brooding until they are 12-16 weeks of age.
7. Selling all breeding birds 2 weeks before any poults are hatched.

Treatment and Control.—Getting an accurate diagnosis is the first essential in the advent of a suspected outbreak of this or any other disease. It is only possible to do this by the aid of the laboratory which includes the aid of a good microscope and the use of bacteriological technic. Live sick birds are necessary for the accurate diagnosis of infectious catarrhal enteritis, although Hexamita may be found by an experienced laboratorian as long as 24 hours after death of the poult, if too rapid decomposition has not taken place.

With our present knowledge of the disease, we can not make any definite recommendations on how to handle an outbreak. Remedies either in the drinking water or feed should be avoided. Keeping the poults warm by increasing the heat in the brooder house and increased effort to keep them comfortable is essential. Removal, and destruction by burial or burning, of all dead poults several times daily is essential to prevent undue spread of the infection. Complete isolation and quarantine of infected pens to prevent spread of the disease to normal poults is the most important factor in the control program. Daily dry cleaning of houses and yards during an outbreak is recommended. Efforts to prevent the spread from sick pens to wall pens will be much more profitable than time spent in mixing remedies or medicating mashes. No drug yet tried in controlled experiments has been effective.—*W. R. Hinshaw and E. McNeil, Division of Veterinary Science, University of California, Davis, Calif.*

Intravenous Injections of Methylene Blue in Canine Eczema

Although eczema may sometimes yield promptly to treatment, it is certainly a troublesome affection of dogs as it must be admitted that relapses are common. Prompted by the work of Roussel and Neuyen van Ba[1] in 1936, the author employed that treatment on 8 dogs and 3 horses with the results described. The preparation used was eosine solution, 1.5 Gm.; methylene blue, 0.5 Gm.; and water, 100 cc. The mixture is filtered and Tyndalized (= fractional sterilization with heat) three times at 80 C. for an hour. Dogs receive 5 cc. and horses 20 cc. every third day. The use of eosine was preconized by Dorelle of Indo-China in 1935.

A 7-year-old dog with a badly inflamed skin responded to 6 doses and was markedly improved after the third dose. The recovery was permanent.

A 3-year-old bitch, refractory to all sorts of treatment for 2 months, was almost immediately cured, notwithstanding an acute pruritus, bleeding sores and generalized alopecia. In 45 days, the coat had recovered its normal sheen.

A Pointer, 2 years old with depilations on the limbs and other parts of the body, showing active pruritus yielded to 3 injections and in 3 weeks had completely recovered.

In five other canine cases of the same general type parallel results were obtained. Of three horses, the results were negative in one. The other two, one a severe case of summer eczema, responded well to 8 and 9 injections respectively.

The author concludes that in the dog this treatment is particularly interesting. The pruritus usually ceases after the third injection and as a rule the cure is obtained in 8 to 40 days. An experience of three years is the background of the author's conclusions. [*Groulade, M. Docteur-Vétérinaire, Monbron (Charante): Methylene Blue in the Treatment of Eczema (title translated), Revue de Médecine Vétérinaire, xcii (May-June, 1941), pp. 124-125.*]

Homing pigeons are used by parachutists to send messages to their headquarters.

[1]Revue Vétérinaire, Jan. 1936, p. 32.

EDITORIAL

Letter to the Press,* Radio and Screen

THIS LETTER is a request for you to abolish the use of the term "horse doctor" in addressing the general population. It is not a suppliant invocation of the cringing sort, nor is it written to appease the many members of this 79-year-old child of the Civil War who wonder why steps are never taken to park that innuendo in the *oubliette*. Letters "to the editor" often remind us that the term is impolite, not appropriate and a poorly chosen wisecrack. The group referred to took the form of a national society 79 years ago next June when Quartermaster General Meigs was perturbed over the sweeping infections of farm animals that were wiping at the main source of food supply and transportation of the Union Army. Its object was to develop the situation which enables the United States to furnish food for the United Nations now fighting for your freedom of speech and other freedoms.

It is no fault of ours that throwing mud may amuse certain crowds better than the finesse of Charles Dickens, Bill Nye or Will Rogers. To us, the dubbing seems like a case of "To hell with fact and human sensitivity." Nor is it our concern that poking fun at human groups and occupations is a none-too-polite habit of the American jokester. One stroke of the pen, one twist of the tongue, one antic across the screen aimed at a vast audience can do a lot of harm or good to a country or to a profession. But, why pick on ours? We are delegated to conserve and develop the nation's main source of wealth and security. Our job is to provide things to eat and to wear in times of peace and to see that nothing in that respect is lacking when war comes along. So, as a simile, intended to tether someone or some occupation to the lower rung, the term of which we speak is not brilliant. If snobbish, it's a boomerang that hurts at both ends of the range.

Millions of domestic animals on millions of thrifty farms are drawn upon for an important implement of war—food—and that is not a coincident of this particular war. During and after the Civil War our federal and state governments, impressed with the importance of farm animals in national welfare, seized the idea of mobilizing a personnel of college-trained veterinarians (horse doctors in the derisive sense) to prevent our main source of wealth from vanishing through clouds of animal diseases. The cliché is hurled at the men who had that job to do. How well the task was done is a page of American history no one should overlook, least of all the successors of the old town crier. If in this war we do not have to await the uncertain arrival of food-laden ships, it's because we did succeed in building up a remarkably well-deployed veterinary service whose pragmatism during the past sixty or more years is one of the marvels of this civilization, and is so regarded by those who get to the bottom of the American development.

THE ANABASIS IS HISTORIC

The curious will run into considerable burlesque (growing pains) in digging through the period of American adolescence. Physicians "read medicine" in the doctor's pharmacy and barged over to the next settlement to practice; dentists "got theirs" watching the stopping and pulling of cavernous molars; the law school was the lawyer's library; preachers, like Topsy, just happened; and veterinarians, whom the more polite called veterinary surgeons

*The agricultural press is not an addressee of this article. Its attitude toward the veterinarians of the country has usually been a constructive one.

after the British custom, "learned their trade" in the rural barns and urban stables. On the heels of this primitive phantasmagoria came the short-term professional schools of medicine, law, theology and veterinary science. The students came from the little red school house with unclassified preliminary sophistry. They were just so many sons of the pioneers (some not so young) destined to become practical men. Their exploitations were the growing communities populated by their peers. Anyhow, the physicians relieved suffering and brought recruits into the world; the dentists took care of the toothaches; the lawyers studied Moses, Blackstone and the statutes crammed with conflicting legislative acts; the preachers saved souls from eternal damnation, sang requiem, and buried the mortal remains; and the veterinarians in brogans and coveralls watched over the health of livestock or kept the wheels of commerce arolling on the streets and highways. Some of these garments covered patent-leather shoes (mind you) and tweeds from Scotland. Coveralls are now a decoration. In *American Notes* Dickens found the tobacco chewers in other professions.

Although nowadays men are judged by what they do, what they say can have a warping effect on misunderstood occupations. The point is that there are firesides and freedom to guard, against our own unmeasured implications as well as against foreign invasion. So why not park the ill-chosen jokes 'til the job is finished?

Because folks are apt to go right on weltering others for amusement regardless of mental pain or material damage, we would realize the futility of this plea were we not at war and were not the watchful operations of the veterinary service so vital to the nation's security. That alone is the reason for lodging this reproach now, for, were the innuendo taken as seriously as intended by a democratic people, it would take more than armies, navies, air forces and congressional appropriations to heal the wound inflicted by that apparently harmless invective. Diseases of farm animals, misunderstood and underestimated, would quickly take command of the situation.

That's one enemy no fleet can stop nor treaty appease. And strangely, few are aware of that deadly ambush.

Here is the situation to ponder. The service charged with guarding the bulk of the nation's food supply had the same origin as the other professional groups and it never lagged. National welfare forbade. At this moment, to be admitted to that service, applicants must come to the veterinary college with high grades or be rejected. They must spend five years in classrooms and laboratories, don cap and gown along with graduates of the other divisions, and pass rigid state board or civil service examinations before entering the field of application. Their training, in addition to the basic medical sciences, comprises the intricacies of livestock sanitary science and police, milk hygiene, meat inspection, surgery and the treatment of the sick. Their course on the vicissitudes of mammalian and avian life is five years of intensive training. The reason for this is the importance of their work. These are your horse doctors—he-men who can take it on the chin and go about their work in silence. The fact that no harm is intended doesn't modify the potentiality of the degradation.

In London at this hour, policemen go from house to house collecting kitchen waste which is boiled down for pig food in large pots at the police stations. There are 18,000 pig clubs in England yielding 3,000 tons of backyard bacon to augment the owners' regular rations (Patricia Strauss in *Reader's Digest*), and in the country school children raise pigs in odd corners and gather acorns to feed them. These are examples connoting what we are trying to put into words.

If World War II brings about a classification of human work according to its usefulness to the general population, it will not have been fought in vain. We hope it does. There is a definite amount of patriotism in lodging this reproach now. So, play the game fair 'til the job is *fait accompli*. The stake is your alimentation and raiment, perhaps more.

Perhaps our story could be told in figures better than in argument. The United

States has undertaken the task of furnishing 70,000,000 British with all of the perishable protein and so-called protective foods they need. And the prospect that we shall have to furnish Russians with the same class of nourishment is in sight. Experts in the food industries* calculate that we shall have to feed 200,000,000 persons outside of our own 131,000,000. To us who keep a close watch on the oscillations of the livestock population and what it produces in food, these figures are staggering. They mean that any one or two of the main farm-animal diseases, if not suppressed, would put the Axis on top of the world quicker than most people realize.

Sentry Dogs for National Defense

Dogs for Defense, Inc., formed and approved with the knowledge of the American Kennel Club, has launched a movement to provide trained sentry dogs for the guarding of munition plants and other vital places of the defense program. Harry I. Caesar, a director of the Club, heads the project and Leonard Brumby, head of the Professional Handlers Association, is the executive director. Former Secretary Joseph C. Hoagland of the Westminster Kennel Club is the treasurer. The secretary is Mrs. William H. Long, who is also supervisor of training. Only purebred dogs will be trained. Preference of breeds is not mentioned. The office of the organization is 221 Fourth Avenue, New York City.

Under date of March 17 at the hour of going to press, Edwin R. Blamey, veterinarian for the American Kennel Club, writes:

> Dogs for Defense, Inc., has been organized in New York to collect and train purebred dogs for war service. The dogs used in this work are donated by breeders all over the United States and are shipped to training centers at the expense of the corporation. Up to the present time some of the dogs, shipped long distances at considerable expense, were found on arrival to be unfit for training due to a variety of disabilities. This waste of time and money could be avoided if the veterinarians of the country would consent to make a physical examination of the candidates for training. It would have to be done without charge as a patriotic gesture.
>
> The Army of the United States has made a request for 200 dogs and many more will be needed.

Dr. Blamey requests that this be brought to the attention of members of the AVMA through the JOURNAL, requesting that this service be rendered and that certificates of fitness be issued without remuneration. The request is valid and approved.

*Food Industries, January 1942, p. 35.

The Country's Food Resources

The annual livestock inventory recently released by the U. S. Department of Agriculture* shows that the total number of meat animals on farms January 1 this year was the largest of record.

Cattle and sheep numbers both set new all-time high records, and hog numbers reached the fourth highest level in 15 years.

The unusual increase in numbers of meat animals this year was due to several factors, the Department pointed out. In the case of cattle, the increase was largely a continuation of the upswing in the cattle number cycle—a periodic increase in cattle production for 6 or 8 years followed by a decrease for a somewhat similar period. With sheep the increase reflected relatively high prices for lambs and wool, a favorable lambing season in 1941, and very good feed and range conditions. Governmental actions of several kinds encouraged a large production of hogs.

Chicken and turkey numbers both increased in 1941. Almost as many chickens were on farms January 1 as in the peak year of 1928, and turkey numbers were over a fifth larger than the average of the preceding 10 years.

Work animals were an exception to the general increase shown by the report. Continuing a trend noted for many years, the number of both horses and mules continued to decline during 1941.

The total inventory value of all livestock on farms increased 31 per cent from a year earlier, and at $6,590,535,000 was the highest since 1920.

*USDA release of February 18, 1942.

President Roosevelt Honors the Veterinary Corps and Its Commander

President Roosevelt's nomination of Col. R. A. Kelser, director of the Veterinary Corps, for the rank of brigadier general was confirmed by the Senate on March 17.

Brig. Gen. Kelser

The promotion is a tribute to the importance and the amount of service the Corps is now known to render and is also a decoration for Colonel Kelser for his efficient command under the present emergency.

The military minded will also approve the strategy of granting proper rank to officers occupying assignments of that magnitude.

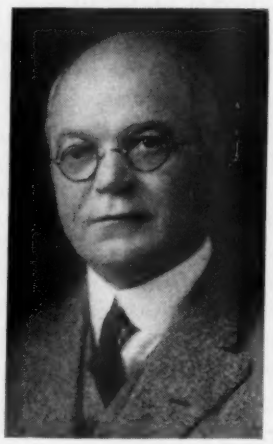
That the American Veterinary Medical Association is gratified at the recognition is self-evident, in view of its continuous interest in the veterinary-military service since the Civil War.

Charles E. Cotton Retires

A news event of outstanding interest to the veterinary service throughout the United States came last month when the retirement of Dr. Charles E. Cotton (U. P. '93), secretary and executive officer of the Minnesota Live Stock Sanitary Board, was announced as effective February 15. The news is outstanding because Dr. Cotton has figured prominently in the affairs of this country and has had an extraordinarily long and brilliant career in the development of the veterinary profession.

Born in Wisconsin in 1871, he was a student of the School of Veterinary Medicine, University of Pennsylvania (1890-1893), a winner of the Lippincott Prize awarded by that institution, and house surgeon at his alma mater (1893-1894). He was a major, Veterinary Corps, U. S. Army (1917-1919), practitioner of Minneapolis (1894-1917), and secretary and executive officer of the Minnesota Live Stock Sanitary Board (1919-1942). All of these connections would be glory enough for one man were they not strewn all along the way with notable achievements.

President of the Minnesota state association (1909-1910), of the AVMA (1916-1917), and of the USLSSA (1936-1937), is a sequence of honors that has come to no other veterinarian. But, these are only honors conferred for a life of work that was full of accomplishments and of sagacity without bourne in the operations of the veterinary profession.



Charles E. Cotton

To name all of the places filled on the executive councils and important committees of these societies, to tell the story of his pioneering in the livestock sanitary affairs of the Northwest and of his masterly work in the Veterinary Corps of World War I, not to mention public health work in the fields of human and veterinary medicine, belongs in the realm of obituary panegyrics, and Charley Cotton is not dead. He has only stepped out to enjoy a life of retirement. May it be long and happy. Rest is the sweet reward of labor but as Horace Greeley would have said, "The word 'rest' is not in his vocabulary."

[Dr. Cotton reminds us that he was elected president of the AVMA as a practitioner, not as a livestock sanitary official as stated in the October (1941) issue of the JOURNAL, page 300, where, under the title "The Source of our Presidents," all of the presidents since 1890 were listed as to the position they held when elected.—Ed.]

The Association's Proposal on Increasing Egg Production

On pages 310-318 of this issue will be found a significant and timely document: a presentation from the Association's Special Committee on Poultry Diseases. Its aim is to provide a sound and economical approach to the increased production program which the poultry industry has been asked to fulfill in 1942. Its realization depends upon the extent to which veterinarians will be willing to participate and the coöperation which other agencies will give in implementing the entire program.

A few months ago, Secretary of Agriculture Wickard asked the poultrymen of America to increase their 1942 egg production by 500 million dozen over 1941; later this figure was raised to 700 million. This is the contribution the poultry industry is expected to make to the "Food for Freedom" campaign which is destined to play an important and perhaps deciding part in ultimate victory.

Is the increased egg production to be obtained simply by brooding more chicks, raising more layers, buying and feeding more feed? Perhaps, but the inherent weakness of such a program founded on "pressure" methods alone is that it may cause its own downfall unless appropriate stress is placed on sanitation and disease control.

The Special Committee on Poultry Diseases has undertaken to analyze the problem and offers a program which is, we believe, not only sound but also economical. It visualizes elimination of some of the wastes due to preventable diseases of poultry and proposes that a considerable share of the needed increased egg production be obtained by that means. The program presented in this issue has been subjected to critical analysis and has been approved by governmental agencies and other qualified authorities competent to determine the results and economies that may be realized.

Here, then, is the opportunity—and responsibility—of the veterinary profession in implementing the initial step by indicating its readiness to work with the poultry science departments of state colleges, with county agents, with extension service representatives and other agencies. In recent years the veterinarians of the country have shown an encouraging response to the needs of poultrymen for qualified services, but the present situation calls for more widespread activity. In turn, the poultry industry has repeatedly indicated its willingness to follow competent leadership in the solution of its disease-control problems.

We urge that every veterinarian read the special report in this issue. As a measure of the response which is needed for successful execution of the program, a coupon is provided on page xxiii. We hope that large numbers of veterinarians in all sections of the country will signify their endorsement and willingness to participate. It is an opportunity for professional service to an industry that needs competent help and should not be forced to turn elsewhere to get it.

Duty No. 1 Never Started

Duty No. 1 of the veterinary profession does not seem to be understood, not even among ourselves. *We have yet to impress the people that their welfare, security and very existence depend upon the control of farm-animal diseases.* Loudly and often we have declared ourselves "the guardians of the livestock industry," engaged in watching over the money invested in farm animals, but have never succeeded in arousing interest in the far-reaching objective of the guardianship. The highest estate of our case has never been taken before the court of public opinion.

Otherwise stated, few connect our vast domestic animal population and the abundance it produces with the work of the doctors of veterinary medicine.

CURRENT LITERATURE

ABSTRACTS

Periodic Ophthalmia

Bacteria, heredity and nutritional deficiency are ruled out as causes of equine periodic ophthalmia. The alleged rôle of visible microbes described by Dalling (1919), Rosenow (1927), Burky (1939) and others has not been confirmed. Moreover, diseases attacking adults in acute form are not apt to be of congenital origin and passed on to the next generation. Nutrition does not play a major rôle since severe outbreaks occur in well-fed horses as well as in the poorly nourished. The ocular lesions of vitamin A deficiency experimentally produced in laboratory rats are pathologically different from those of periodic ophthalmia in horses. Although helminthic larvae have been isolated by others in the chambers of the eye ball of horses showing apparently identical symptoms, the author did not find that factor present in 80 cases critically examined. Systemic sensitivity to foreign proteins, though unproved, may be logically entertained.

Method of direct ophthalmoscopy.

The author leans strongly toward the ultravirus theory for various reasons: the work of Bossi (1928), of Wood and McChesney (1930), Stubbs and Radcliff and of Stubbs and Murphy (1938), coupled with general behavior of the disease among army horses.

As to treatment, little benefit was obtained from systemic chemotherapy (iodides, arsenicals, sulfanilamide, quinine). Constant merit

Acute periodic ophthalmia—second day. Note the exudate in the ventral half of the anterior chamber. The pupil and iris are not visible. Marked ptosis and photophobia made it necessary to open the lids with the finger. The bright spot in the dorsal part of the cornea is the reflex of the light used in photographing the eye and should be disregarded.

Complete cataract—right eye of a mule. Note that the pupillary margin is irregular. Also note the deep wrinkle in the upper lid. The diffuse light area above the pupil is the reflex on the cornea of the light used in preparing the photograph and should be disregarded.

could not be shown. Sterile milk may, perhaps, cut short the duration of attacks but it did not prevent recurrence. Mydriatics are essential to prevent synechias. For this purpose atropine sulfate (2%) is recommended. The mydriatic solution is instilled every 20 minutes until the pupil is dilated and then every 2 to 4 hours to prolong the dilatation through the acute stage. Butyn (1%) may be used to relieve acute pain. Hypodermic or intravenous injections of sterile milk and of typhoid vaccine, based upon the philosophy of nonspecific protein therapy, may shorten the duration of the attack but was not effective in preventing recurrence.

The whole gamut of cause, course, pathology, symptoms and diagnosis is covered in an article of 26 pages illustrated with 25 halftones, 12 of which are from microphotos of the more revealing type. [*Jones, T. C., B.S., D.V.M., Veterinary Corps, U. S. Army, Veterinary Research Laboratory, Front Royal: Equine Periodic Ophthalmia, American Journal of Veterinary Research, iii (Jan. 1942), pp. 45-71.*]

Pancreatic Symptomatology

Because the pancreas is not accessible to direct exploration, its diseases are detected by expressions of the functional troubles arising either from alteration of its endocrine or exocrine secretions. The clinical examination, therefore, ranks first in the incrimination of that gland. The cardinal symptoms of hypo- or hyperfunction showing disturbed glyco-regulation are more revealing than biological procedures. They indicate trouble that can not be associated with any other lesion than that of the pancreas.

Unfortunately, this precious symptomatology appears too late to resort to corrective measures. While somewhat uncertain, the biological tests are the more sensitive in mapping out appropriate treatment in the early stages. The tests of the endocrine function are:

1. Testing the urine for sugar and its amount if present.
2. Determination of the glycemia after fasting.
3. Modification in the glycemia after feeding test meals (provoked hyperglycemia) or by insulin injections.
4. Determination of carbohydrate tolerance by testing the urine after the administration of glucose.
5. Testing the pH of the blood and urine.

In general, it must be admitted that hypoinsulinism is associated with glycolysis and acidosis of the blood, while in hyperinsulinism the tolerance for glucose is increased.

Unfortunately, pancreatic diseases affecting only the exocrine function can not be detected by these biological tests. Their symptoms are vague and as a rule go undetected in the practice of veterinary medicine. There is nothing symptomatic in proteolytic, lipolytic, amylolytic suppression of pancreatic origin. Defaults are compensated by other organs (liver, stomach, salivary glands). As a matter of fact, pancreatic pathology has not been studied seriously in domestic animals, notwithstanding the important rôle it has to play in the nutritive process. [*Pierre, M., professor of physiology, École Vétérinaire de Toulouse, Revue de Médecine Vétérinaire, xci (Sept.-Dec. 1940, p. 499.)*]

Connective Tissue Tumors in Horses and Mules

Out of 156 connective tissue tumors ablated from horses and mules at the clinic of Iowa State College, 65 were benign and 91 were malignant. Age was not a factor in the incidence. More than half of the sarcomas occurred in young horses ranging from 1 to 4 years of age.

—Photo by George R. Fowler.

A 32-lb. fibrosarcoma on the head and neck of a 4-year-old mule.

A myxofibroma was removed from a colt of 4 months. Of the benign tumors, 50 per cent were fibromas and of the malignant group 89 per cent were fibrosarcomas. As to site, 39 per cent of the sarcomas were located in the head and nasal passages, 31 per cent on the limbs and 31 per cent scattered. More than

half of the benign tumors were in the head region.

Classified, the benign growths were: fibroma, 32; myxofibroma, 2; osteofibroma, 9; myxoma, 1; fibromyxoma, 3; osteomyxoma, 3; osteofibromyxoma, 4; lipoma, 1; osteoma, 1; fibroösteoma, 3; fibromyxoösteoma, 1; fibrochondroma, 1. The age range was from 4 months to 26 years. Nine of the growths were associated with sites of injury. The difficulty of differentiating fibroma from mature granulations or slight infected tissue is pointed out.

Of the 91 sarcomas removed from 80 animals, 65 of the animals were horses and 15 were mules. These are classified as follows: fibrosarcoma, 81; myxosarcoma, 1; myxofibrosarcoma, 5; osteofibrocarcoma, 2; myxoösteosarcoma, 1. There was recurrence in 11 removed. Invasion of regional lymph nodes was found in but 2 cases, obviously from adenitis rather than from metastasis. There was no uniformity in size. The largest (see figure) weighed 31.9 lb. [*Runnells, Russell A., D.V.M., M.S., and Benbrook, E. A., D.V.M., Veterinary Division, Iowa State College: Connective Tissue Tumors in Horses and Mules, American Journal of Veterinary Research, ii (Oct. 1941) pp. 427-429.*]

Fever Therapy in Turkeys

Inasmuch as fever therapy has been successfully employed in human medicine for the past 15 years but has not been attempted in domestic fowls, the authors thought it desirable to ascertain whether certain poultry diseases and parasites could be controlled by that method of treatment. The *Trichomonas gallinarum* which infects the ceca and liver of turkeys in much the same manner as *Histomonas meleagridis*, the specific protozoon of blackhead, was selected for the experiment. Most of the turkeys used were *naturally* infected. Experimental lesions are difficult to produce by inoculation. As fast as the disease developed in the station flock, the diseased birds were handled in such a way as to collect the droppings for microscopic examination. Birds that passed no feces because of not having eaten for several days before they were caged, were force fed in order to obtain droppings. The diagnosis was confirmed by inspecting the lesions in the ceca and liver through an abdominal incision behind the keel bone, in addition to the microscopic examination of the droppings. The inspection was made with the aid of a strong light.

The fever was induced by means of a cabinet heated with six 100-watt bulbs. The temperature and humidity of the cabinet were regulated with a thermostat and electric fan. The birds were exposed to a temperature of 104 to 106 F. for 1 to 2 hours. The condition of the turkey determined the number, duration and frequency of the treatments.

A total of 122 turkeys ranging from 3 to 15 months old were treated. Two died from overheating the cabinet. The recoveries were 83.3 per cent in the treated birds and 30.6 per cent in the checks. Details are contained in a table and two graphs. Summarized, the data showed that the type of Trichomonas infecting turkeys at the Beltsville station can be successfully treated with fever therapy. [*Olsen, Marlow W., and Allen (Miss) Ena A., Beltsville Research Center, USDA: Fever Therapy in the Control of Cecal and Liver Trichomoniasis in Turkeys. Poultry Science xxi (March 1942), pp. 120-127.*]

Antitularemic Serum Not Potent

A study of antitularemic serum prepared from horses, sheep and rabbits, and human convalescent serum, measured in experimentally infected white mice, increased the survival time but not the mortality of the disease in the infected animals. Human convalescent serum did not protect mice, but normal horse and normal rabbit serum prolonged life 11 per cent and 56 per cent respectively. Concentration of the serums did not alter the results, regardless of the agglutination titer. Methods of growth, assay of titer, concentration of serum, and tabulation of results are given. [*Francis, Edward, and Felton, Lloyd D. Antitularemic Serum, Public Health Reports, lvii (Jan. 1942), pp. 44-55.*]

A Discussion of Mastitis in Cows

Mastitis in dairy herds is of primary significance. About 15 to 40 per cent of all dairy cows have the disease in some degree. The disease reduces milk production one-sixth, and it is costly to the milk dealer through rejections of market milk. It impairs quality, and acceptability by the consumer. Though most of the associated microbes are not pathogenic for man, it does cause some epidemics of septic sore throat. Clean milk is preferable to pasteurized. Control is, therefore, a matter of general interest. Among the various organisms involved, *Streptococcus agalactiae* is the most common. The infection enters *via* the teat canal. It is sucked into the canal in the milking process or by means of defective sphincters, caused by injury. Feeding experiments have been negative.

The *physical methods* of detection are palpation for areas of fibrosis and presence of clumps, clots and strings in the foremilk, detected by use of the strip cup. When the milk appears normal *chemical tests* are employed (brom thymol blue, methylene blue, silver nitrate, catalase, rennet, sodium hydroxide, bromcresol purple). The *microscopic examination* of milk and bacteriological studies are the most reliable.

The orthodox management of the herd and

milking routine together with the drugs now used in intraudder treatment (acriflavine, gramicidin, trypaflavin, novoxil) are mentioned. [*Davis, H. L., Kimmer, W. H., and Anderson, J. A.: A Discussion of Mastitis, Journal of Milk Technology, v (Jan.-Feb., 1942), pp. 18-27.*]

Experimental Encephalomyelitis in Chicks

Although various domestic and wild species of Aves have been found to be susceptible to the eastern type of equine encephalomyelitis, the authors were unable to infect 2- to 3-week old chicks with the western type injected intracerebrally. The 5th, 12th and 29th passages of the virus in pigeons were used. All chicks remained healthy. (*Levine, Norman D. and Graham, Robert: Nonpathogenicity for Chicks of Western Equine Encephalomyelitis Virus, Vet. Med. xxxvii (March, 1942), pp. 116-117.*

BOOK NOTICES

The Physiology of Domestic Animals

Five editions since 1933 is the record made by "Dukes' Physiology," the name commonly used for this book among veterinarians. The record speaks for itself not only from the educational point of view but also as a "gap filler" in the fixed literature of the hour, in so far as readers of English are concerned, for, to be offensively frank, the veterinary profession has trudged along through its formative years with archaic mammalian physiology built up exclusively on teachings more applicable to the human being or the horse than to the diversified genera comprised in the entire domestic animal group. While the old "friends" were revised (on rare occasions), they have lacked the true facts of animal physiology needed to keep pace with developments in pathology, biochemistry, endocrinology, genetics and nutrition which have revolutionized medical science, particularly veterinary science, where each genus and species has functions peculiar to itself, and which have a bearing on utilitarian medicine. In short, animal physiology to be useful in the practice of modern medicine, must be veterinary in fact. Little beyond things elemental can be safely left to the generalities formerly accepted as sufficient to round out a veterinary-medical education. Dukes' work, from the first through the fifth edition, covers and modernizes the field by abridging the text and appending an extensive bibliography to each chapter.

The fourth edition is dated 1937, the fifth 1942, or five years later. This semi-decennial revision proves how rapidly progress in other branches of medicine nullifies physiology that is not brought up to date. While the revision consists of interpolations rather than changes *per se*, they reveal the author's new interpretations of vital facts as well as new knowledge added to the general subject since 1937. In the latter category are the new concepts on nutrition and endocrines which the researches of the last five years have materially changed and augmented.

The book is divided into 10 parts subdivided into 40 chapters which run through the gamut of tutorial physiology for the veterinary field. The topography is excellent, illustrations (drawings, photographs, tables) graphic and the type easy to read. Veterinarians who avoid dropping below the necessary level of current knowledge will not be disappointed with this book, and the profession on the whole will continue to be delighted that "one of us" is filling a hiatus in the veterinary literature of this period. [*The Physiology of Domestic Animals by H. H. Dukes, D.V.M., M.S., professor of physiology, New York State Veterinary College. Comstock Publishing Company, Ithaca, N. Y. 1942. Cloth. 721 pages. Illustrated. Price $6.00.*]

Report of the Division of Veterinary Science Michigan State College—1941

The student enrolment for the year was: first year, 63; second year, 53; third year, 69; fourth year, 55; preveterinary year, 57; total, 297. Of these 175 were from Michigan (=60%), 23 from Indiana, 19 from Wisconsin, 14 from New Jersey, 13 from Massachusetts, 11 from Illinois and 7 or less from each of 14 other states, Panama and Puerto Rico.

On May 8, the headquarters of the state selective service announced that veterinary medicine had been added to the list of occupations having a "dangerously low level of manpower." Reports from various departments of the government indicate that the operations of the veterinary profession should not be interrupted in the preparedness program.

Additions and alterations to buildings were completed during the year and one teacher was added to the staff. Accommodations for the departments of pathology, bacteriology, physiology, surgery and medicine were thus improved. The Junior AVMA was active in social and professional functions and it continued the publication of a professional magazine —the *M. S. C. Veterinarian*. Prominent figures addressed meetings of the Chapter during the year.

The work of the different departments are described and tabulated as to class hours, courses, methods, and material utilized. The whole gamut of farm, pet and fur-bearing animals entered in the teaching and research programs. Of the 11,184 (not including poultry) animals treated, 3,473 were hospital cases. Cattle predominated with 4,919 cases; dogs were second with 2,885 cases; and horses third with 1,189 cases. The fourth on this descend-

ing scale was hogs with 898 cases. Evidently, the mule population of Michigan is small as only 2 mules were treated.

These statistical records on clinical and investigational work and the brief on the researches of the Section of Bacteriology under the direction of I. F. Huddleson, coupled with the service of the college's extension specialists—B. J. Killham and E. S. Weisner—prove that M. S. C. is doing its duty to the animal industry of the state and to the veterinary profession of the nation, thanks to the planning and management of Dean Giltner. (*Report of the Division of Veterinary Science, Michigan State College, East Lansing. Brochure of 60 pages. 1941.*)

Annual Report of the National Foundation for Infantile Paralysis

The Foundation was sponsored by President Roosevelt, September 23, 1937 and was organized under the laws of New York, January 3, 1938. The certificate of incorporation limits its operations to those of a medical and educational nature related to the crippled person. It may enter into contracts to carry out its purposes. Its powers are vested in a Board of Trustees of 33 representative men from all parts of the United States.

Its scope of activity is the broad field of unsolved problems presented by this grave virus infection which was recognized as a clinical entity 100 years ago. Investigational work, heretofore, has depended upon sporadic and temporary grants. The coördination and continuation of research work can now be carried out without interruption for whatever time that may be necessary. No one can predict the amount of time and money that will be needed to reach the full objective. Besides studies of the cause, prevention and amelioration, the procedure outlined is designed to clarify the real problems and the best methods for their solution. During the fiscal year 18 grants and an appropriation were made to universities, hospitals and research foundations for studying the nature and action of the virus. These grants totaled $805,562.10. It is now known that the virus is widespread, that there are numerous health carriers, that it can be borne by flies from place to place, and that it can enter the body by various routes. An obstacle to the research work is the absence of a susceptible, small, laboratory animal. The monkey (*Macacus rhesus*) is costly and now difficult to obtain. Chemotherapy is not neglected. More than 100 chemical agents have been tried in vain.

The grants for research made during the year amounted to $185,565.06.

Miss Kenny's physiotherapy designed to relax the spasms and train muscle function is endorsed. New light has been shed on the distribution of the virus in the nervous system. It is not as local as was formerly supposed.

For the year mentioned, the cash income of the foundation was $1,036,480.14 of which $1,007,594.69 was derived from the 1941 Birthday Celebration. The condensed balance sheet shows cash assets of $1,278,065.73. [*The National Foundation for Infantile Paralysis, Annual Report 1941. 57 page booklet, published by the Foundation, 120 Broadway, New York.*]

Bill and the Bird Bander

This is a brief natural history of bird life among the keys, jungles and sea shore of Florida written in the form of a fascinating narrative. The hero is "Bill," juvenile chum of a professional ornithologist of the federal wildlife service once known as the Bureau of Biological Survey, USDA. The story is of bird migration and of its purposes as carried out by experts. Their records, and vast sum of knowledge about birds and their relation to things mundane is removed from the category of dull reading by relating the adventures of "Bill" and the Professor in their work of trapping migrant birds for leg banding.

The book is an excellent manual on the popular and some technical names of more than 100 species of migrant flyers all the way from the tiny humming bird to the monstrous pelican as seen in Florida, a natural stopping off station along the two-way route of these seasonal tourists of the airways.

The history of leg banding begins in the eighteenth century when (1710) a gray heron banded in Turkey was captured in Germany. Audubon banded a brood of phoebes at Philadelphia in 1803, and some storks and starlings were banded in Denmark in 1899. But it was not until 1920 that the work was taken up in earnest in the United States. Since then, expert ornithologists of the federal government have enriched the knowledge of avian history through having leg banded more than 2,250,000 migrant birds at various places on the continent.

The book, besides being highly entertaining reading, teems with useful information on bird life (feeding, breeding, travels) that is not included in the average budget of common knowledge—knowledge that broadens the mind and the usefulness of the professional man working in the animal kingdom. For the children at school, the author has written a gem. [*Bill and the Bird Bander by Edna H. Evans. The John C. Winston Company, Chicago, Philadelphia, Toronto. 225 pages. Illustrated. Price, $1.50.*]

Annual Report of the Surgeon General of the Army

Although this public document covers the fiscal year ending June 30, 1941, or five months before the declaration of war against the Axis powers, it is nevertheless of more than usual interest since that fiscal year was characterized by the mobilization and training of the largest peacetime military force in American history. The vital statistics tabulated cover the calendar year of 1940 during which the strength of the Army was greatly increased by expansion of the Regular Army, the federalization of the National Guard and the inductions under the Selective Service Act. Topographically, the book is a complement of tables and graphs interspersed with descriptive texts.

The amount of space given over to the different divisions of the Medical Department, reflects their relative importance. Out of the 279 pages, the Veterinary Division takes 52 pages; the Dental Division 6; and the Nursing Division 4. The rest goes to the medical service which comprises numerous divisions and subdivisions (statistical, personnel, library, hospitalization, sanitary engineering, preventive medicine, *et al.)*.

On June 30 1941, there were 596 veterinary officers on active duty. Of these, 126 were of the Regular Army, 34 of the National Guard. 435 of the Reserve Corps, and 1 of the Sanitary Corps Reserves. Out of this number 66 were on duty at Air Corps installations and 146 with tactical units.

Besides the basic and postgraduate instruction given to veterinary officers at the Army Veterinary School where 26 completed the course during the year, a school on military meat inspection was conducted in Chicago where approximately 20 graduated monthly. The training of enlisted personnel is carried out at all posts and stations but some obtain special training at the Army Veterinary School, Army Medical Center in Washington. The veterinary laboratory work of the Army is described. These laboratories in addition to carrying out various research projects *(e.g.* periodic ophthalmia, influenza), produce such biological products as mallein, tuberculin, encephalomyelitis vaccine, equine infectious abortion bacterin and certain serums and antigens. Corps area laboratories were established at each of the nine corps areas, and department laboratories in Puerto Rico and the Panama Canal zone. Provision was made for veterinary sections at these laboratories. The production and usage of biological products by the Veterinary Division runs into large figures. An example is the 773,550 doses of encephalomyelitis vaccine of the three standard types (western, eastern, bivalent).

It is, however, in the food-inspection service that figures run highest. One table gives the quantity of food (all kinds) inspected as 578,431,086 pounds, of which 16,578,865 pounds were rejected. Other tables showing the causes for which food products were rejected reveal the vital significance of that duty.

There were 97 veterinarians on duty with the CCC camps where it was shown that the rejections represent a saving of $607,004.07 to the government, or three times more than the pay of the inspectors. If computed for the entire army, it is evident that the Veterinary Division of the Medical Department renders a great money-saving as well as health-saving service.

Another item not generally considered is the poundage of food of non-animal origin the veterinary service inspects. Of fresh and canned fruits and vegetables there were 762,314 pounds inspected and of this amount, 11,889 pounds were rejected.

The inspection of forage for the army animals is another duty that receives but little popular attention, yet here one finds that the Corps inspected 235,086,263 pounds and rejected 12,772,997 pounds, over 3,000,000 pounds of which were pronounced unfit and 8,000,000 below the grade specified. Another unknown is that there were 26,001,229 pounds of forage raised on government reservations, that passed the scrutiny of the veterinary officers, not to mention the inspection of mounts at the time of procurement.

The tables on animal diseases are a worth while study of the classical nomenclature which should replace (in civil life) the archaic names that have dogged veterinary literature since remote antiquity. Yet, quittor, splint, ringbone, and stringhalt still live while spavin parades under the classical (but cumbersome) term of "arthritis chronica deformans tarsi." Just why the others must go on bearing the old nicknames is not clear, for it seems that "periostitis chronica deformans metatarsi" and "osteitis chronica deformans digatus" would not make the limp any worse. Seriously, those who undertake revision of the old veterinary terms run headlong into an impractical task. This reviewer has attended conferences where this revision was on the agenda but nothing ever came of it because it was found that nothing but long top-heavy words, without hope of popular adoption, were in sight.

There are 36 tables and two drawings covering the incidence of disease and injury among army animals and their cause. In these, one finds a study of ratios showing where preventive measures are the most important. An example is the high percentage of saddle, collar and harness sores—bane of military horsemanship — which not only "lay up'" many horses but actually in campaign can practically paralyze a horsed detachment. It is said that saddle sores defeated the French cavalry at the beginning of World War I.

(Annual Report of the Surgeon General, U. S. Army, to the Secretary of War. 1941. United States Government Printing Office.)

THE NEWS

AVMA Activities

Twelfth International Veterinary Congress Prize

Chairman Jakeman of the Committee on Twelfth International Veterinary Congress Prize urges the participation of all AVMA members in nominating candidates for the Twelfth International Veterinary Congress prize for 1943.

In 1934, when the Twelfth International Veterinary Congress was held in New York City, a considerable sum of money was raised in the United States to entertain the delegates. Inasmuch as part of this sum was not spent, the Congress authorized the AVMA to establish this as a permanent fund and to divert the interest therefrom into a yearly award based on distinguished service to veterinary science and the livestock industry. Accordingly, this award is made at each annual convention of the Association.

Nominations should be submitted, not later than June 1, 1942 either directly to Dr. H. W. Jakeman, 44 Bromfield St., Boston, Mass., or to the central office of the AVMA.

Last Call for Volunteer Papers—1942 Convention

Members are reminded that they have until April 15 to submit the titles of papers they may wish to present to the Committee on Program for the 79th annual meeting in Chicago, August 17-20.

The Committee will welcome offers for the section programs together with suggestions for speakers and topics for the general sessions in order that the meeting may be outstanding in the timely nature and calibre of the material presented.

See page 266 of the March JOURNAL for complete information, and send in your ideas now.

» » » » » »

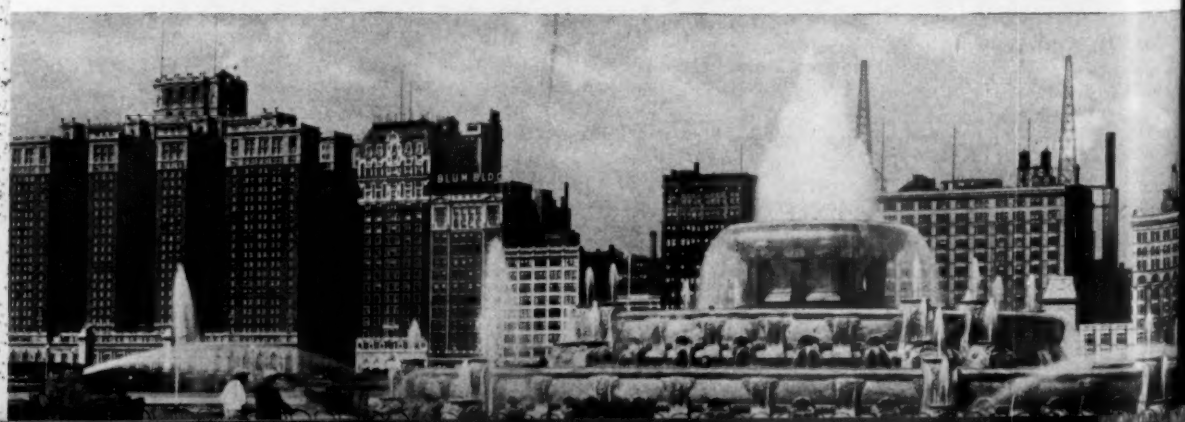
The Stevens in Chicago—World's Largest Hotel — Headquarters of the Seventy-Ninth Annual Meeting, August 17-20

When the 79th annual convention was transferred from San Francisco to Chicago for reasons already told, the Executive Board, on the recommendation of the Committee on Local Arrangements and the Veterinary Exhibitors Association, approved the Stevens Hotel on Chicago's Lake Front as the headquarters.

The Stevens faces east on Michigan Avenue occupying the entire block from 7th to 8th streets. As a lookout point in American cities, it has few equals:—The view is of Soldier Field, Field Museum of Natural History, Adler Planetarium, Shedd Aquarium, Logan Monument, Symphony Orchestra Shell, Buckingham Fountain, Art Museum, Lake Michigan, and miles of parkways and drives threading 200 acres of well-groomed landscape.

A visit to the headquarters chosen for the 1942 convention will be a visit indeed, independent of the usual attractions local committees always plan for the entertainment of the registrants.

In the dark building in the shadow of Buckingham Fountain are the offices of the Association—a short block from The Stevens, which is the large building at the left of the picture.



APPLICATIONS

First Listing*

ALLMON, HORACE RAYMOND
1121 Park Drive, Hillsboro, Texas.
D.V.S., Kansas City Veterinary College, 1911.
Vouchers: Homer H. Greenlee and W. R. McCuistion.

BARTLEY, FRANK E.
Westboro, Mo.
D.V.M., Iowa State College, 1941.
Vouchers: C. H. Covault and M. J. Johnson.

BAYNES, W. R.
322 Agri. Bldg., Raleigh, N. C.
D.V.M., Ohio State University, 1922.
Vouchers: A. A. Husman and Wm. Moore.

BROCKMEIN, E. A.
Manchester, Iowa.
D.V.M., Iowa State College, 1923.
Vouchers: R. M. Hofferd and J. C. Glenn.

BRODNER, MEIER
323 Livestock Exchange Bldg., Sioux City, Iowa.
D.V.S., New York State Veterinary College (at New York University), 1919.
Vouchers: R. B. Briney and T. A. Moir.

BURBY, J. W.
2423 Broadway, San Antonio, Texas.
D.V.S., American Veterinary College, 1891.
Vouchers: Matthew E. Gleason and Chas. W. Neal.

COFFIN, DAVID L.
4418 Osage Ave., Philadelphia, Pa.
V.M.D., University of Pennsylvania, 1938.
Vouchers: E. L. Stubbs and M. A. Emmerson.

FOGEL, S. H.
Greenwood, Miss.
M.D.V., McKillip Veterinary College, 1909.
Vouchers: Wm. L. Gates and J. G. Hardenbergh.

JONES, ROBERT B.
206 E. Wade St., Wadesboro, N. C.
D.V.M., Kansas City Veterinary College, 1913.
Vouchers: J. H. Brown and A. A. Husman.

KOSHLAND, EDWIN M.
231 E. Church St., Williamsport, Pa.
V.M.D., University of Pennsylvania, 1939.
Vouchers: Robert G. Little and William H. Ivens.

LARSON, M. C.
Keystone, Iowa.
D.V.M., Iowa State College, 1938.
Vouchers: John B. Bryant and Frank Breed.

LOGIE, ABBY J.
3015 Paseo, Kansas City, Mo.
D.V.M., Texas A & M College, 1941.
Vouchers: Elmer N. Davis and H. C. Berger.

MERRIMAN, R. W.
417 W. Capitol Ave., Springfield, Ill.
D.V.M., Iowa State College, 1923.
Vouchers: Sidney A. Berry, Jr., and Theodore M. Bayler.

MILLER, J. P.
814 6th St., Boonville, Mo.
D.V.M., St. Joseph Veterinary College, 1920.
Vouchers: J. C. Flynn and L. A. Merillat.

MORGAN, W. R.
Main St., Shelburne, Ont.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: H. MacDonald and W. Moynihan.

MYERS, W. W.
1795 Moore St., San Diego, Calif.
D.V.M., Colorado State College, 1930.
Vouchers: Frank D. McKenney and E. F. Sheffield.

NELSON, R. S.
Tonasket, Wash.
D.V.M., State College of Washington, 1918.
Vouchers: T. R. Myers and M. O. Barnes.

O'HARA, CHARLES B.
Eaton, Ohio.
D.V.M., Cincinnati Veterinary College, 1912.
Vouchers: W. F. Guard and J. G. Hardenbergh.

OLIVER, V. T.
c/o Southwest Veterinary Hospital, 7731 S. W. Capitol Hwy., Multnomah, Ore.
D.V.M., Kansas State College, 1938.
Vouchers: Chas. H. Seagraves and James L. Adams.

OLTHOUSE, MARTIN
116 N. Otsego, Jackson, Mich.
D.V.M., Grand Rapids Veterinary College, 1912.
Vouchers: E. T. Hallman and B. J. Killham.

PADFIELD, CYRIL J.
1437 Riverside Drive, Los Angeles, Calif.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: W. L. Curtis and G. S. Glover.

PAXTON, JOHN D.
4990 Ventura Ave., Fresno, Calif.
D.V.S., Colorado State College, 1912.
Vouchers: Donald Barr and L. D. Leonard.

SMITH, F. W. B.
739 Hastings St., W., Vancouver, B. C.
B.V.Sc., Ontario Veterinary College, 1916.
Vouchers: S. N. Wood and J. G. Jervis.

*See January 1942 issue, p. 92.

STEPHENSON, ALFRED R.
Bennett, Iowa.
D.V.M., Iowa State College, 1918.
Vouchers: John D. Reardon, A. H. Quin and C. C. Tucker.

STEVENS, BLAIR A.
176 15th St., Oakland, Calif.
D.V.M., State College of Washington, 1938.
Vouchers: Paul D. DeLay and Wilfred S. Bentham.

THOMSON, WILLIS A.
County Agent's Office, La Crosse, Wis.
D.V.M., Kansas State College, 1935.
Vouchers: James S. Healy and Vernon F. Ziebell.

WILLIAMS, ROY C.
New Richland, Minn.
M.D.V., McKillip Veterinary College, 1910.
Vouchers: Howard C. H. Kernkamp and John N. Campbell.

WORTON, HAROLD
734 Water St., Petersborough, Ont.
B.V.Sc., Ontario Veterinary College, 1936.
Vouchers: W. Moynihan and R. A. McIntosh.

Second Listing

Allen, G. A., Conrad, Iowa.
Allen, G. H., 715 E. 9th St., Ft. Worth, Texas.
Barnhart, Emmett P., 1127 Industrial Trust Bldg., Providence, R. I.
Bowker, G. W., R. F. D. No. 1, Rolla, Mo.
Button, A. I. Sr., 219 S. Central, Kent, Wash.
Callander, W. G., 506 Ann St., Parkersburg, W. Va.
Castleberry, M. W., 418 Government St., Baton Rouge, La.
Cilley, G. Carroll, Iron Works Rd., Concord, N. H.
Clausen, C. N., 1127 4th St., Los Banos, Calif.
Dappen, B. E., Graettinger, Iowa.
Ebright, Marvin S., Mifflintown, Pa.
Ferrell, Edwin H., 418 Government St., Baton Rouge, La.
Fischer, Fred. F., 312 Federal Building, Boise, Idaho.
Gomel, C. L., 2623 E. 4th Ave., Spokane, Wash.
Gould, O. S., Nevada, Mo.
Greiner, Norma L., 1207 State Office Bldg., Richmond, Va.
Griffin, H. M., Morning Sun, Iowa.
Hink, George G., 110 S. 5th St., Mapleton, Iowa.
Houston, Rafe Ashley, Box 502, Blakely, Ga.
Hufft, E. E., Liberty, Mo.
James, William D., 112 N. Jackson, Greencastle, Ind.
Kirsch, P. N., 115 W. Benton, Carrollton, Mo.
Kleeman, Ed. P., 2000 Harle Ave., Cleveland, Tenn.
Leighton, Marion L., 529 S. Broadway, Yonkers, N. Y.
Menaul, William, 1346 Vandercock Way, Longview, Wash.
Modlin, E. D., Eaton, Ohio.
Murphy, Olin T., 358 S. Kirkwood Rd., Kirkwood, Mo.
Norman, M. E., 1346 Vandercock Way, Longview, Wash.
Rey, Robert S., Rt. 2, Box 510, Visalia, Calif.
Stallings, W. L., Forest City, N. Car.
Strickler, Bert, Skidmore. Mo.
Thompson, John Boyd, Oakes, N. Dak.
Weisbard, E. C., Allison, Iowa.

Can You Help Locate These Lost Members?

The aid of JOURNAL readers is solicited in locating the following members, mail to whom has been returned to the Association's central office. The last known address of each is given. Should you be able to provide information as to present residence, your advice via postcard or letter will be greatly appreciated.

Anderson, Dan J., 309 E. Moore Ave., Terrell, Texas.
Boyce, Jr., Capt. R. A., Fort Riley, Kan.
Bridge, Roy L., 1430 N. Capitol Ave., Indianapolis, Ind.
Bridges, B. F., P. O. Box 1622, Billings, Mont.
Burns, Chas. G., Tallahassee, Fla.
Cornwell, James I., Star Route, Asheville, N. C.
Dean, Wm. D., Tupelo, Miss.
DeMott, Andre R., Utica St., De Ruyter, N. Y.
Dorney, George, Box 12, Pine Plains, N. Y.
Dowds, Stanley J., Floodwood, Minn.
Earhart, Capt. Robert N., Kelly Field, Texas.
Gleason, J. L., 43 Bemeda Ave., Toronto, Ont. Can.
Green, James C., 330 Federal Bldg., Madison, Wis.
Gross, Fred, 6157 Justin, Chicago, Ill.
Harris, Fred M., 72 3rd Ave., San Mateo, Calif.
Hayes, Isaac E., 1012½ Wellington, Waterloo, Iowa.
Hedler, Herbert R., 1130th Co. CCC, Camden, Me.
Hinkle, T. B., 301 Broadfoot Ave., Fayetteville, N. Car.
Holmes, John Marshall, R.F.D., Chesterland, Ohio.
Horn, Wiley H., Box 490, Kirksville, Mo.
Huston, Sherbern S., 2723 Arlington Ave., Davenport, Iowa.
Irvin, Kenneth W., Roseau, Minn.
Leasure, Elden E., 809 Vermont, Lawrence, Kan.
McDaniel, Jr., Geo. T., Box 82, Covington, Ga.
Mallay, F. A., 205 P. O. Bldg., South St. Paul, Minn.
Mathis, Rudy Cletus (State Veterinarian), Atlanta, Ga.
Melmen, Harold, 7931 Georgia St., Silver Springs, Md.
Merritt, W. E., Phoenix, Ariz.
Mitchell, Howard H., Rolla, N. D.
Nuckolls, Melvin N., Marshalltown, Iowa.
O'Reilly, Thomas, c/o Hodson Hotel, Ashland, Kan.
Polansky, Henry, Box 249, Lewisburg, W. Va.

Prendergast, Bruce, Avon, Ill.
Shelby, Clarence F., Winnsboro, La.
Smock, Lt. Col. Stanley C., 333 E. Main St., Morristown, N. J.
Stechel, Leo M., c/o C. Paul, 7 S. Madison Ave., Spring Valley, N. Y.
Storm, Robert E., Co. B., Batt. 31st, 4th Platoon, Camp Grant, Ill.
Swart, P. Bruce, Med. Reception Center, Camp Grant, Ill.
Title, Harold B., 233 Maple St., Laurel, Miss.
Tuomy, G. F., Astoria, Ga.
Werrin, Lt. Milton, 408 S. 30th St., Philadelphia, Pa.
Winchester, Ben N., Box 2112, Ancon, Canal Zone.
Winter, E. F., Oxford, N. Car.
Wakeman, S. A., 4835 Lake Park Ave., Chicago, Ill.

U. S. GOVERNMENT

BAI Transfers and Personnel News*

Charles Barnes from Lyndonville, Vt. (in chg. meat inspection) to New York, N. Y. (meat inspection).

Sidney A. Berry from Topeka, Kans. (tuberculosis) to Chicago, Ill. (tuberculosis).

Beck B. Bowen from St. Paul, Minn. (meat inspection) to Prairie du Chien, Wis. (in chg. meat inspection).

Granville W. Breed from Boston, Mass. (tuberculosis) to Jacksonville, Fla. (tuberculosis).

Andrew J. Greely from Nampa, Idaho (meat inspection) to San Francisco, Calif. (meat inspection).

Myles J. Edwards from Baltimore, Md. (tuberculosis) to Hartford, Conn. (tuberculosis).

Samuel F. Griesemer from Duluth, Minn. (in chg. meat inspection) to Mason City, Iowa (in chg. meat inspection).

Earl E. Manter from Athens, Ohio (in chg. meat inspection) to Lyndonville, Vt. (in chg. meat inspection).

W. Wayne Miller from Chicago, Ill. (meat inspection) to Chicago, Ill. (Pathological Division).

Earl L. Mundell from Kansas City, Kan. (meat inspection) to Kansas City, Kan. (virus-serum control).

William Q. Nelson from Des Moines, Iowa (tuberculosis) to Sioux City, Iowa (virus-serum control).

John R. Pooley from Prairie du Chien, Wis. (in chg. meat inspection) to Duluth, Minn. (in chg. meat inspection).

John R. Scott from Mason City, Iowa (in chg. meat inspection) to Kansas City, Kan. (meat inspection).

Harvey E. Smith from Olympia, Wash. (tuberculosis) to Spokane, Wash. (meat inspection).

John R. Wirthlin from Richmond, Va. (tuberculosis) to Jacksonville, Fla. (tuberculosis).

Harry K. Walters (assistant veterinarian, yard inspection work) Pittsburgh, Pa., retired.

*Parenthesized words indicate the line of duty.

Fish and Wildlife Service.—There is a demand for information on current wildlife research that is being conducted throughout the United States. To supply that demand the Service will endeavor to assemble and release such information annually in condensed form.

The Service, therefore, suggests that workers send before June 1, 1942, to the Fish and Wildlife Service, Department of the Interior, Washington, D. C., titles of research problems upon which they may be working with name and address and year of probable completion.

AMONG THE STATES

California

Dourine.—The work of controlling the outbreak of dourine in the southern part of the state continues to occupy the attention of the veterinary service. All horses in San Diego and Imperial counties have been tested. Out of more than 13,000 tested, 29 positive cases were found and destroyed. Dr. C. U. Duckworth, administrator of the division of animal industry, in directing this campaign has urged all horse owners, especially in the southern part of the state, to be on the lookout for signs of the disease.

Knowing the havoc the disease is capable of creating among horses, if not handled vigilantly, the dourine episode of California, Arizona and Nevada is a current example of the importance of maintaining a classical veterinary service. A few years of indifference or of quackery would have been sufficient to have implanted this "syphilitic" plague beyond control throughout the equine population of the entire country.

District of Columbia

District Association.—The first quarterly meeting of 1942, Harry A. Locke presiding, was held at the Mayflower Hotel January 22.

Lt. Col. Olson J. Gentzkow, chief of the Chemical Section, of the Medical Corps, U. S. Army, spoke on "Sulfanilamide Drugs, Their Uses and Actions".

The officers elected for the year were A. E.

Veterinary Detachment, Veterinary Station Hospital, Fort Robinson, Nebraska.

Wight, president; Major Charles S. Greer, first vice-president; C. Kenneth Francis, second vice-president; W. M. Mohler, secretary-treasurer (reëlected).

Among the guests were veterinarians visiting in Washington and officers attending the Army Veterinary School.

s/W. M. Mohler, *Resident Secretary.*

Illinois

Chicago Society Holds Military Session.—The monthly meeting of the Chicago Veterinary Medical Association held at the Sherman Hotel, February 10, was devoted to the discussion of the military situation as it affects the veterinary service of the country. The principal speakers were the following officers of the Veterinary Corps, U. S. Army, now on duty in the 6th Corps Area:

Col. J. E. Noonan.—Organization of the Veterinary Corps and Service.

Lt. Col. L. L. Shook.—Training of Veterinary Officers in Food Inspection.

Lt. Col. S. C. Dildine.—Duties of Veterinary Officers in Field and Supply Units.

Since the Executive Board of the AVMA has voted to hold the 79th (1942) meeting in Chicago instead of in San Francisco, the necessary coöperation with the state and local associations was undertaken. President W. C. Glenney of the state association represented the veterinarians of the state in planning for that unexpected change. Realizing that the time is short and that much work has to be done to carry out a successful convention, these two societies (Illinois and Chicago) are awake to the responsibility. It was the consensus that the 1942 meeting is in fact an obligation of the 3rd Executive Board District (Illinois, Indiana, Wisconsin), in which Chicago is favorably located as a center of the veterinary population and of the area. All local societies of these three states are being invited to participate in planning and carrying out the meeting.

Iowa

The ratio of members of organized veterinary medicine to total licensed graduates appears to be higher in Iowa than any other state, and the total attendance at local and state associations seems to indicate that society work throughout the state is more systematically and earnestly pursued than elsewhere. Moreover, the financial report of Secretary-Treasurer Franks of the state association for 1942 shows liquid assets running into higher than usual figures—$12,096.06—notwithstanding that $2,351.99 was spent in publishing its bimonthly magazine.

Maine

State Association.—The Association has voted to hold meetings bimonthly instead of quarterly as heretofore. Many interesting meetings have been held and the members feel that more time should be devoted to important matters. Maine has one of the most active veterinary societies in New England and its meetings are well patronized.

s/S. W. Stiles, Falmouth Foreside.

Massachusetts

Borden and Dodge Observe Fiftieth Anniversary of A.V.C. Graduation.—March 24 marked the fiftieth anniversary of graduation from the American Veterinary College for C. R. Borden of Taunton and W. H. Dodge of Leominster.

On the occasion of these golden anniver-

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1. Lt. Col. F. C. Sager, Commanding
2. Major C. D. Barrett, Assistant Commander

3. Captain N. F. Christensen
4. Lieut. K. E. Sadler
5. Lieut. P. G. Papish
6. Captain B. F. Trum
7. Lieut. L. S. Hughes
8. Lieut. D. K. Theophilus
9. Lieut. J. L. McKitrick
10. Sergeant L. E. Woodcock
11. Corporal S. L. Layher
12. Staff Sgt. L. J. Bunge
13. Staff Sgt. D. B. Russell
14. Master Sgt. A. E. Peterson
15. Tech. Sgt. W. G. Henry
16. Sergeant H. C. Holder
17. Sergeant H. G. Stansberry
18. Staff Sgt. A. J. Westphalen
19. Corporal B. E. Jacobs
20. Pvt. Icl. E. E. Kelly
21. Pvt. F. B. Colby
22. Pvt. Icl. R. J. Smith
23. Pvt. Icl. T. C. Walker
24. Pvt. Icl. R. O. Bierman
25. Pvt. F. M. Sterling
26. Pvt. Icl. E. C. Black
27. Pvt. Icl. H. C. Blank
28. Pvt. A. J. Moskolenko
29. Pvt. J. H. O'Kelley
30. Pvt. G. W. Richmond
31. Pvt. H. M. Bonsall
32. Pvt. B. L. Dutton
33. Pvt. A. Schaffer
34. Pvt. Icl. J. J. Naber
35. Pvt. K. E. Hudson
36. Pvt. L. A. Pearson
37. Pvt. Icl. E. J. Brown
38. Pvt. L. Shelhamer
39. Pct. Icl. C. H. Dill
40. Pvt. D. Monteith
41. Pvt. Icl. M. F. Jasmann
42. Pvt. W. C. Floyd
43. Pvt. E. W. Bradley
44. Pvt. Icl. R. L. Smith
45. Pvt. Icl. L. M. Barnum
46. Pvt. Icl. C. L. Trim
47. Pvt. J. L. Hinkle
48. Pvt. Icl. W. A. Gramly
49. Pvt. A. W. Secrest
50. Pvt. L. E. Fitzpatrick
51. Pvt. Icl. A. F. Rust
52. Pvt. E. E. Fox
53. Pvt. E. E. Luehrs
54. Pvt. F. J. Olbricht
55. Pvt. J. B. Tillman
56. Pvt. R. G. Hunt
57. Pvt. C. R. Jameson
58. Pvt. L. W. Wortman
59. Pvt. H. I. Holmes
60. Pvt. A. Hardinece
61. Pvt. A. T. St. Onge
62. Pvt. Icl. N. B. McClellan
63. Pvt. E. G. Cranmore
64. Pvt. Icl. A. A. Martin
65. Pvt. Icl. E. Gross
66. Pvt. E. V. Brown
67. Pvt. J. W. Beman
68. Pvt. C. E. Chipperfield

saries in veterinary education, President Jakeman of the AVMA sent warm letters of felicitation to Drs. Borden and Dodge which signalized their many years of devotion and service to the profession.

Minnesota

State Association. — The following are addenda to the brief report of the annual meeting held at the Hotel Curtis January 8-9, (*Vide* March issue, p. 272). The meeting was a celebration of the Association's forty-fifth anniversary. . . In the main, committee reports were presented in the form of prepared papers. . . The committee reports included colleges, infectious diseases, legislation, medicine, milk inspection, public relations, stallion registration, surgery and field practice, and ethics.

In addition to the technical papers reported in the March issue were contributions by:

J. E. Peterson, Lincoln, Nebraska.—The Diagnosis and Control of Swine Erysipelas.

Carl Schlotthauer, Mayo Foundation, Rochester.—Nervous Diseases of Animals.

C. A. Nelson, Brainerd—Conservation. Dr. Nelson's discussion led to the forming of a new standing committee to be known as the Committee on Diseases of Wild Animals.

W. L. Boyd, Chief of the Division of Veterinary Medicine, University Farm.—In the capacity of toast master at the annual banquet, introduced Professor Brain of the Department of Physical Education, University of Minnesota who presented a film entitled "Golden Gophers in Action".

Carl H. Ecklund, M. D., Minnesota depart'ment of health.—The 1941 Epidemic of Encephalitis in Man.

C. H. Roger, dean of the College of Pharmacy, University of Minnesota.—The Sulfa Drugs.

• • •

R. L. West Succeeds C. E. Cotton.—The story of the accession to the position of executive officer and secretary of the Minnesota Live Stock Sanitary Board is best told by quoting the *Waseca* (Minn.) *Journal* of February 18:

"A Waseca veterinarian stepped into the highest position open to men in his profession in the state of Minnesota Friday when Dr. R. L. West took over new duties as secretary and executive officer of the State Live Stock Sanitary Board.

"In taking over the position he succeeds Dr. C. E. Cotton, who held the secretaryship for the past 22 years and during that time built up a nationwide reputation for his work in combating tuberculosis in cattle.

"Dr. Cotton retired to make the position available for Dr. West.

"With the retirement of Dr. Cotton in view, Dr. West was appointed as a veterinarian to the board on Feb. 15, 1941, where he understudied the famous Minnesota leader for a year. At that time he turned his local practice over to his son, Dr. Leland West, then working in partnership with his father.

"Dr. West has been residing in St. Paul since September, and his permanent offices are located in the state office building.

"As secretary and executive officer of the board, Dr. West will administer the acts of the body. The Board is composed of prominent livestock men from all sections of the state. It controls actions to prevent the spread of communicable and contagious diseases of live stock, particularly when that disease might be transferred to humans. The board also controls all inter and intrastate shipments of live stock, regulates community sales and processing companies, administers Bang's testing, T. B. testing and rabies control, and works to prevent any other outbreaks of diseases in animals.

"Dr. West has been a resident of Waseca since he was discharged from the army following the last world war. He opened offices here on Dec. 30, 1918.

"During his residence in Waseca he was active in civic affairs. He served on the school board for nine years, was president of the board for six. He was a charter member of the local Legion Post where he acted as commander, adjutant, and a member of the executive board.

"He is a past president of the Minnesota State Veterinary Medical Association and in 1941 completed 12 continuous years of service on the association's executive board.

"At the time of his appointment as veterinarian to the board in 1941 he was forced to resign his position as alderman from the second ward in Waseca."

New Jersey

The Monmouth County Veterinary Medical Society met at the home of Dr. E. L. Brower, Freehold, on February 18. After discussion, the society voted to urge the state association to formulate a definite public relations policy. The next meeting will be held on March 18.

J. R. Porteus, *Secretary.*

New York

Western (N. Y.) Association.—At a meeting held in Buffalo, December 11, 1941, the Western New York Veterinary Medical Association carried out a clinical program at which was demonstrated (1) the agglutination method of detecting leptospirosis in dogs, (2) the reposition and retention of a complicated fracture of the pelvis and femur, (3) cesarean section and hysterectomy in a Fox Terrier and (4) a case

of anemia from malnutrition. The literary program comprised papers by:

A. G. Danks, New York State Veterinary College.—Some Unusual Clinical Cases.

William J. Stiles, Rochester.—Leptospirosis in Dogs, and a demonstration of its diagnosis by the serologic test.

John Bernotavicz, Needham Heights, Mass. —Nutrition, in which the highlights of nourishment of small animals were discussed.

The officers elected for 1942 were E. G. Thompson, Honeoye Falls, president; B. H. Volgenau, Buffalo, vice-president; F. F. Fehr, secretary-treasurer (reëlected).

A resolution was passed indorsing a project of the state association to procure the enactment of a law providing for the inspection of all meat consumed in the state.

s/F. F. Fehr, *Secretary.*

North Carolina

Roanoke-Tar Association.—Among the older group of local associations is the Roanoke-Tar Veterinary Medical Association, named for the two river valleys indicated in the title. The members live and practice in the valleys and on the watersheds adjacent to these streams both of which flow through the coastal plain. In the beginning there were but six members who met monthly with their wives at the homes of one another, the hostess serving supper. This was perhaps the pioneer of the now popular dinner sessions of veterinarians of the present time that are held throughout the country.

While the meetings were held less frequently after the first six or eight years, there was at least one meeting a year and this was carried out in the form of a family picnic.

In October, 1941, when more veterinarians had moved into the territory, and the radius was extended, the monthly meetings were revived. Fifteen members and their wives attended the last of these meetings, which are now held at some hotel or eating place in the district. Recent meetings have been held at Rocky Mount, Weldon, Nashville, and Henderson. The dinner at Henderson in February, given at the Vance Hotel at 6 o'clock, was followed by a series of demonstrations at the hospital of A. C. Yow and an entertainment for the ladies at the home of Dr. and Mrs. Yow.

Among the early promoters of this local society are W. R. Bass, J. H. Brown, J. L. Bullock, W. A. Carter, W. L. Starling and A. C. Yow. Regularly participating in the meetings at present are L. H. Hicks, C. E. Hoffman, W. A. Jordan, M. H. Mathis, T. A. Monk, A. J. Osteen, W. H. Potts, J. W. Shannon and B. H. Staton. Dan Barber of Richmond, Va., is a constant patron.

The society does not plan formal technical programs, but there are always ample discussions, demonstrations and surgical operations to serve its purpose in that respect. An occasional outside speaker is invited to bring in a special message. Except for a secretary to notify members when and where a meeting is to be held, there are no officers. The secretary is C. E. Hoffmann, of Nashville, N. C.

s/J. H. Brown, *Resident Secretary.*

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Personal.—A. O. Shaw, D.V.M. (C. V. C. '15), associate professor of dairy husbandry, Kansas State College, has been appointed head of the Department of Animal Industry, North Carolina State College. The position includes the direction of dairy production and management, animal husbandry, and animal nutrition. Dr. Shaw went to Manhattan in 1939 from New York and has had charge of the Kansas State dairy herd. He coached the collegiate dairy cattle judging team that won first honors at the Dairy Cattle Congress in 1941.

Ohio

O. S. U. Veterinary Conference Postponed.—Dean O. V. Brumley of the College of Veterinary Medicine, Ohio State University, announces the postponement until a later date of the Veterinary Conference usually scheduled each June at that institution. This postponement is necessitated by the adoption of the accelerated, four-quarter curriculum at the college (see page 386). Announcement will be made as soon as a new date for the conference has been decided upon.

Oklahoma

State Association. — Eighty veterinarians attended the twenty-seventh annual meeting held in Oklahoma City, January 12-13. The session included a technical program, banquet, meeting of the Ladies' Auxiliary, and election of officers. The officers elected were Major H. J. Wirtz, Veterinary Corps, U. S. Army, president; R. H. Gump, Ada, vice-president; and F. Y. S. Moore, McAlester, secretary-treasurer (reëlected). The Ladies' Auxiliary elected Mrs. F. Y. S. Moore, McAlester, president; Mrs. F. R. Knotts, Stillwater, vice-president; and Mrs. H. D. Ricks, Oklahoma City, secretary-treasurer.

The technical contributions and reporters were:

E. R. Franks, Kansas State College.—Bovine Surgery, illustrated with motion pictures.

W. W. Armistead, Texas A. & M. College.—Clinical Aspect of Heartworm Infection in Dogs, and Uremia and Nephritis in Dogs.

H. C. Smith, Oklahoma A. & M. College.—Research Problems Encountered at the A. & M. College, Calcium Therapy, and Leptospirosis.

Lewis E. Harris, chemist, Norden Laboratories, Lincoln, Nebr.—Recent Advances in Chemotherapy, and the new Food and Drug Act.

Eugene B. Ingmand, Jensen-Salsbery Laboratories, Kansas City, Mo.—Gramicidin in the Treatment of Mastitis.

Arthur A. Hellbaum, M. D.—Sex Hormones.

Students of the College provided the entertainment for the banquet which was attended by 125.

Pennsylvania

Keystone Association.—The Committee on National Defense is coöperating with the society for the prevention of cruelty to animals in planning for the care of war casualties among animals. The plan includes furnishing ambulance and hospital service . . . The Association has successfully prosecuted two persons who had been violating the state licensure laws and secured a fine of $50.00 in each case. The prosecution of a practitioner of animal dentistry has been postponed . . . The memberships of five members were revoked on account of objectionable advertising in telephone directories.

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State Association.—The Preparedness Committee organized under the arrangement between the AVMA and the federal Procurement and Assignment Service has contacted the state's 13 local societies for the purpose of keeping in close connection with the veterinary situation created by the war effort.

South Carolina

State Association.—President R. F. Poole of Clemson College was the guest speaker at the annual meeting held in Columbia, January 20. . . There will be no summer meeting this year on account of holding the annual meeting of the Southern Veterinary Medical Association at Atlanta in the fall. . . The nominations for chairman and members of the Veterinary Preparedness Committee made by the Executive Board were approved, and plans are being worked out to perform the Committee's function of coöperating with the government in its war effort. The officers elected were: T. J. Dickson, Rock Hill, president; H. L. Sutherland, Union, vice-president; and R. A. Mays, Columbia, secretary-treasurer.

s/W. A. Barnette, *Resident Secretary.*

Texas

Junior Chapter.—A Junior Chapter of the state association was established by the veterinary students of the A. & M. College, pending the approval of the faculty. The plan is for making chapter members full members of the state association at the time of graduating, and to issue an award of $25.00 annually to a senior student of high standing.

Washington

State Association.—The western branch of the state association held a meeting in Seattle February 7, at which 36 members were present. Retiring President H. W. Marsden presented the gavel to F. E. Smith, his successor. A feature of the meeting was the report on the activities of the State Preparedness Committee. Papers were read by G. W. McNutt, J. L. Gidley, E. M. Gildow, Robert Prior, and Col. Solon B. Renshaw of Fort Lewis. A movement to revise the constitution and to incorporate under the state laws was inaugurated.

COMING MEETINGS

District of Columbia Veterinary Medical Association. Mayflower Hotel, Washington, D. C. April 21, 1942. W. M. Mohler, secretary, 5508 Nebraska Ave., N. W., Washington, D. C.

American Animal Hospital Association. 9th annual meeting. Palmer House, Chicago, Ill. April 7-9, 1942. R. E. Ruggles, secretary, 901-19th St., Moline, Ill.

North Carolina State Veterinary Medical Association. Shelby, N. Car. June 25-26, 1942. J. H. Brown, secretary, Tarboro, N. Car.

American Society of Veterinary Therapy. Kansas City, Mo. June 29-July 1, 1942. J. C. Flynn, secretary, 3026 Main St., Kansas City, Mo.

American Veterinary Medical Association. Chicago, Ill. August 17-20, 1942. J. G. Hardenbergh, executive secretary, 600 S. Michigan Ave., Chicago, Ill.

DEATHS

James M. Armstrong of 90 Greenwood Ave., Rumford, R. I., died at the age of 68 on March 10, 1942. Born in East Providence on Nov. 11, 1874, Dr. Armstrong was graduated from Harvard University in 1897 and joined the Association in 1899. He was State Senator before the first World War, and also held the office of state meat inspector for many years.

Luther R. Cummings (Grand Rapids, '13), Spring Valley, Wis., died January 10, 1942, and was interned at Wisconsin Dell, January 13. Secretary J. S. Healy reports Dr. Cummings as a lovable person, a capable and successful practitioner, and a faithful supporter of the national, state and local associations. He was a past master of Spring Valley Lodge, A. F. & A. M. and a member of the Woodmen of America. He is survived by his widow, two brothers and a sister.

Isaac E. Woodard of Natchitoches, La., died early in 1941 at the age of 75. Born September 22, 1886, at Coushatta, La., Dr. Woodward was graduated from the Arkansas Veterinary College in 1920. He joined the AVMA in 1940.

VETERINARY PREPAREDNESS

Each month in this section, information will be presented on veterinary participation in the nation's war effort.

State Veterinary Preparedness Committees

The over-all organization and functions of the Procurement and Assignment Service were set forth in the March JOURNAL (*vide* pages 280-300). The personnel of the nine corps area committees each of which has a veterinary member was included in Appendix 2 of the published information. In addition, there are in each state separate committees representing respectively the veterinary, medical and dental professions.

Presented herewith are the complete rosters of the state veterinary preparedness committees, the chairmen of which were listed in the February JOURNAL (pages 174-175). The method of selecting the state chairmen and committee members was as follows:

> Each state veterinary association or its proper executive body was requested to nominate a chairman. The nominations were forwarded to the Procurement and Assignment Service in Washington. Official notices of appointment were then sent to the persons nominated from the office of the Director of Defense Health and Welfare Services under which the Procurement and Assignment Service functions. Following nomination and appointment, each veterinary state chairman was requested to form a state veterinary preparedness committee with the advice and approval of the state association or its executive committee.

This method was designed to assure a representative organization in each state which would function capably in carrying out the duties assigned. The state chairmen and state committees function in an advisory capacity to the corps area committees and to the central office of the Procurement and Assignment Service. To the state committees will be referred, especially, questions concerning the essential character of such services as a veterinarian may be rendering, thus determining his availability. State committees will also familiarize themselves with the functions of the Procurement and Assignment Service and thus be able to advise those in their communities concerning its work.

Alabama: R. S. Sugg, chairman, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn; L. E. Beckham, Tuscaloosa; R. E. Jackson, Montgomery; I. S. McAdory, Auburn; E. H. Walker, Hartselle; M. W. Williams, Auburn.

Arizona: T. B. Jones, chairman, 105 Capitol Bldg., Phoenix; J. T. Dungan, Glendale; K. O. Lassen, Phoenix; Ward R. Lee, Phoenix; J. B. McQuown, Tucson; Wm. J. Pistor, Tucson.

Arkansas: Joe S. Campbell, chairman, Route 4, Little Rock; D. F. Eveleth, Fayetteville; Guy A. Railsback, Batesville; Allen W. Rice, Little Rock; John C. Smith, Stuttgart.

California: J. M. Arburua, chairman, 26 Fell St., San Francisco; H. S. Cameron, Davis; C. U. Duckworth, Sacramento; L. M. Hurt, Los Angeles; H. M. O'Rear, Sacramento; M. J. O'Rourke, San Francisco. **District Subcommittee for Southern California:** L. M. Hurt, chairman, 721 W. Orange Grove Avenue, Sierra Madre.

Colorado: Floyd Cross, chairman, Division of Veterinary Medicine, Colorado State College, Fort Collins; R. M. Gow, Denver; E. Heiny, Denver; N. J. Miller, Eaton; H. G. Weigand, Englewood.

Connecticut: Edwin Laitinen, chairman, 993 No. Main St., West Hartford; E. M. Bitgood, Hartford; G. Leroy Cheney, Woodbridge; Erwin Jungherr, Storrs; R. L. Smith, Hartford.

Delaware: Harry McDaniel, Jr., chairman, State Board of Agriculture, Dover; H. P. Eves, Wilmington; C. C. Palmer, Newark.

District of Columbia: A. E. Wight, chairman, Bureau of Animal Industry, Washington; Joseph F. Crosby, Washington; H. A. Locke, Washington; H. W. Schoening, Washington; Mason Weadon, Washington.

Florida: J. L. Ruble, chairman, 1600 No. Orange Ave., Orlando; T. H. Applewhite, Jacksonville; M. W. Emmel, Gainesville; J. V. Knapp, Tallahassee; G. E. Pace, Marianna; J. H. Yarborough, Miami.

Georgia: J. M. Sutton, chairman, Sylvester; B. E. Carlisle, Camilla; W. C. Dendinger, Atlanta; S. F. Stapleton, Americus; J. C. Wright, Atlanta.

Idaho: Arthur P. Schneider, chairman, 2406 Pleasant Ave., Boise; E. Don Copple, Boise; Fred F. Fischer, Boise; Phil H. Graves, Idaho

Falls; Glenn C. Holm, Moscow; H. E. McMillan, Rupert.

Illinois: A. E. Bott, chairman, 1317 Pennsylvania Ave., East St. Louis; T. M. Bayler, Chicago; C. E. Fidler, Springfield; Robert Graham, Urbana; W. H. Shaw, Pawnee; D. E. Sisk, Mansfield.

Indiana: Charles C. Dobson, chairman, New Augusta; Wayne Alter, St. Paul; J. L. Axby, Indianapolis; G. E. Botkin, Marion; Harry W. Brown, Ft. Wayne; J. C. Carrico, Bicknel; C. R. Donham, Lafayette; G. A. Franz, Indianapolis; O. C. Shockley, New Ross; T. L. Steenerson, Wilkinson; W. A. Sullivan, Indianapolis; J. E. Tinder, Brook.

Iowa: A. R. Menary, chairman, City Hall, Cedar Rapids; J. A. Barger, Des Moines; C. C. Franks, Des Moines; Charles Murray, Ames.

Kansas: R. R. Dykstra, chairman, Division of Veterinary Medicine, Kansas State College, Manhattan; C. W. Bower, Topeka; T. P. Crispell, Parsons; H. F. Dotson, Wichita; Ralph Graham, Topeka; J. W. Lumb, Manhattan; George Rathman, Topeka.

Kentucky: Arthur J. Kay, chairman, 517 Murray St., Frankfort; L. L. Breek, Frankfort; W. M. Coffee, La Center; E. E. Coshow, Frankfort; Charles E. Hagyard, Lexington; Floyd E. Hall, Lexington; Charles E. Palmer, Shelbyville.

Louisiana: E. P. Flower, chairman, Box 24, Baton Rouge; W. A. McDonald, Baton Rouge; A. H. Groth, Baton Rouge; J. D. Jones, Bastrop.

Maine: P. R. Baird, chairman, 52 Pleasant St., Waterville; B. J. Cady, Augusta; M. E. Maddocks, Augusta; J. F. Witter, Orono.

Maryland: A. L. Brueckner, chairman, College Park; J. Earle Gilfillan, Galena; O. L. Lockwood, Baltimore; Mark Welsh, College Park; Hulbert Young, Baltimore.

Massachusetts: Harrie W. Peirce, chairman, 100 Nashua St., Boston; E. M. Aldrich, Boston; John B. Lentz, Amherst; L. A. Paquin, Webster; A. H. Russell, Concord.

Michigan: B. J. Killham, chairman, Michigan State College, East Lansing; C. H. Clark, Lansing; A. E. Erickson, Charlotte; C. H. Hays, Lansing; L. A. LaFont, Detroit.

Minnesota: C. E. Cotton, chairman, 3145 Portland Ave., Minneapolis; W. L. Boyd, St. Paul; H. A. Evenson, Sacred Heart; R. H. Forsythe, South St. Paul; W. J. Fretz, St. Paul; E. L. Gutenschritter, Virginia; R. A. Hallquist, Brainerd; J. A. Quirk, Ada; C. F. Schlotthauer, Rochester; A. H. Schmidt, Triumph; Ralph L. West, St. Paul; R. C. Williams, New Richland.

Mississippi: E. S. Brashier, chairman, State Livestock San. Board, Jackson; Vann F. Bess, Vicksburg; E. H. Durr, Jackson; Wm. L. Gates, Clarksdale; Hartwell Robbins, Jackson; R. H. Stewart, State College.

Missouri: S. W. Haigler, chairman, 7645 Delmar Blvd., St. Louis; Geo. E. Bartholomees, Sheldon; Cecil Elder, Columbia; J. W. George, Jefferson City; H. J. Hearrington, Lexington; E. C. Hughes, Jefferson City; J. L. Wells, Kansas City.

Montana: W. J. Butler, chairman, c/o Capitol Station, Helena; G. W. Cronen, Helena; B. O. Fisher, Great Falls; Hadleigh Marsh, Bozeman; H. C. Roquet, Big Timber; E. A. Tunnicliff, Bozeman.

Nebraska: W. T. Spencer, chairman, Livestock Exchange Bldg., Omaha; J. W. Murdoch, Lincoln; D. C. Scott, Tekamah; John R. Snyder, Lincoln; L. Van Es, Lincoln; J. E. Weiman, Lincoln.

Nevada: Edward Records, chairman, University of Nevada, Reno; W. B. Earl, Reno; S. H. Still, Reno; G. T. Woodward, Fallon.

New Hampshire: R. W. Smith, chairman, State House, Concord; (E. M. Aldrich, Boston, Mass.); C. L. Martin, Rochester; Haven T. Paul, Portsmouth; Ernest F. Waller, Durham.

New Jersey: A. W. Smith, chairman, 8 Longview Rd., Livingston; R. A. Hendershott, Trenton; G. H. Kimnach, Hightstown; J. A. S. Millar, Deal; J. R. Porteus, Trenton; George E. Taylor, New Brunswick.

New Mexico: S. W. Wiest, chairman, Box 75, Santa Fe; J. W. Benner, Las Cruces; Glen S. Bolton, Albuquerque; F. W. Fish, Albuquerque; T. I. Means, Santa Fe; F. L. Schneider, Albuquerque.

New York: Albert L. Brown, chairman, Adams; E. T. Faulder, Albany; F. F. Fehr, Buffalo; George Freer, Liberty; W. M. Long, Baldwinsville; R. S. MacKellar, Sr., New York; A. E. Merry, Syracuse; E. V. Moore, Cortland; J. J. Regan, Utica; R. H. Spaulding, White Plains; C. E. Stone, Penn Yan; J. D. Sweet, Chateaugay; Arthur Trayford, Huntington, L. I.; C. P. Zepp, New York.

North Carolina: Wm. Moore, chairman, Department of Agriculture, Raleigh; C. D. Grinnells, Raleigh; A. A. Husman, Raleigh; H. J. Rollins, Rockingham; B. H. Staton, Rocky Mount.

North Dakota: R. E. Shigley, chairman, 710 2d St., S.E., Minot; T. O. Brandenburg, Bismarck; F. E. Driver, Bismarck; J. O. Foss, Fargo; M. C. Hawn, Fargo.

Ohio: D. C. Hyde, chairman, 1700 Arlington Ave., Columbus; H. E. Ash, Bowling Green; Frank L. Carr, Columbus; A. J. DeFosset, Columbus; E. A. Downs, Mt. Sterling; C. W. Fogle, Leipsic; W. F. Guard, Columbus; H. A.

Hoopes, LaRue; R. E. Rebrassier, Columbus; B. L. Runyan, Springfield.

Oklahoma: L. J. Allen, chairman, 1610 No. Ellison St., Oklahoma City; C. H. Faulks, Oklahoma City; W. C. McConnell, Holdenville; C. H. McElroy, Stillwater; D. H. Ricks, Oklahoma City; O. E. Robinson, Bixby.

Oregon: Fred W. Lange, chairman, 855 Belmont St., Salem; E. E. Chase, Portland; Sam B. Foster, Portland; W. H. Lytle, Salem; J. N. Shaw, Corvallis.

Pennsylvania: Ernest W. Hogg, chairman, 20 Darling St., Wilkes-Barre; M. W. Allam, Media; R. C. Dayton, Pittsburgh; H. W. Herriott, Hershey; Joseph J. Johnson, Lancaster; L. A. Klein, Philadelphia; Ira Mitterling, Hollidaysburg; L. A. Peterson, Lewiston; H. B. Prothero, Johnstown; J. B. Reidy, Harrisburg; H. B. Roshon, Reading; P. L. Rouse, Erie; J. F. Shigley, State College; R. M. Staley, Narberth; J. J. Thomas, LeMoyne.

Rhode Island: J. S. Barber, chairman, 560 Pleasant St., Pawtucket; E. P. Barnhart, Riverside; E. J. Cole, Pawtucket; John P. Delaplane, Kingston; Howard F. Ferguson, Newport.

South Carolina: R. A. Mays, chairman, Room 415, John C. Calhoun Office Bldg., Columbia; W. A. Barnette, Greenwood; J. T. Dickson, Rock Hill; W. K. Lewis, Columbia; B. C. McLean, Aiken.

South Dakota: D. L. Cotton, chairman, Beresford; J. T. McGilvray, Sioux Falls; Neil Plank, Pierre; S. R. Robinson, Pierre; J. B. Taylor, Brookings.

Tennessee: M. Jacob, chairman, University of Tennessee, Knoxville; H. L. Fry, Nashville; J. H. Gillmann, Memphis; C. E. Kord, Nashville; L. D. Nowell, Humboldt; A. C. Topmiller, Nashville.

Texas: T. O. Booth, chairman, 2002 W. T. Waggoner Bldg., Fort Worth; A. C. Burns, Cleburne; L. G. Cloud, Fort Worth; H. L. Darby, Fort Worth; R. T. Dickinson, Dallas; R. P. Marsteller, College Station; D. L. Rhea, San Antonio; J. W. Ward, Houston.

Utah: W. H. Hendricks, chairman, 1419 East 17th South St., Salt Lake City; H. H. Cohenour, Salt Lake City; John I. Curtis, Richfield; J. C. Flint, Salt Lake City; D. E. Madsen, Logan.

Vermont: A. A. Mortimer, chairman, 27 Central St., Randolph; L. A. Evans, Essex Jct.; N. H. Howlett, Montpelier; G. N. Welch, Northfield.

Virginia: I. D. Wilson, chairman, Virginia Polytechnic Inst., Blacksburg; H. C. Givens, Richmond; H. S. Miller, Richmond; Taylor P. Rowe, Richmond; L. E. Starr, Roanoke.

Washington: M. O. Barnes, chairman, P. O. Box 57, Olympia; J. C. Exline, Olympia; M. E. Norman, Longview; H. A. Tripeer, Walla Walla; E. E. Wegner, Pullman.

West Virginia: H. M. Newton, chairman, P.O. Box 1721, Charleston; T. C. Green, Charleston; C. W. Groppe, Elm Grove; C. E. John, Weston; H. B. Langdon, Charles Town; J. H. Rietz, Morgantown.

Wisconsin: W. Wisnicky, chairman, University of Wisconsin, Madison; B. A. Beach, Madison; J. S. Healy, Madison; E. C. Humke, Sturgeon Bay; V. S. Larson, Madison; B. L. Lawlor, Shullsburg; J. B. Wilson, St. Croix Falls.

Wyoming: H. D. Port, chairman, 304 Capitol Bldg., Cheyenne; L. N. Davidson, Sheridan; F. H. Melvin, Cheyenne; L. H. Scrivner, Laramie.

Accelerated Curriculums Adopted by Veterinary Schools

To meet the anticipated increased need of the nation at war for trained veterinary manpower, the recognized veterinary schools in the United States have voluntarily adopted what amounts to a year-round plan of operation. This will enable veterinary students to complete the regular veterinary course (exclusive of pre-veterinary work) in three years instead of four. Pre-veterinary courses will also be so timed as to enable entering students to take advantage of the accelerated curriculums.

In adopting the program, care has been taken to insure that high educational standards will be maintained—standards which the schools and the AVMA have advanced over the years and will continue to foster. The courses of instruction and the total time spent in school by veterinary students will be essentially the same as under the usual curriculums. The schools will resume normal schedules whenever conditions permit.

Following is a brief résumé of information now available. Interested persons are advised to write directly to the respective deans for exact information as to when the new school year will begin at their institutions and for other advices concerning the accelerated program.

Alabama Polytechnic Institute has adopted a four-quarter system of twelve weeks each to run successively through 12 months of the year. Three degree courses running five hours per week will be offered each quarter along with military and physical training.

Colorado State College will give three semesters a year of 16 weeks each instead of the usual two. The present senior class will graduate on May 18, 1942, and a new class (and semester) will start on May 25, 1942. If the war continues, another new class (and semester) will start in January 1943, and so on.

Iowa State College has adopted an accelerated program to begin June 5, 1942, continuing for four quarters each year instead of the usual

three. Only the three upper classes will be offered work this summer. The incoming first year class will begin work in the fall quarter, September 16, 1942. The accelerated program is required of all students.

Kansas State College has adopted a plan of optional accelerated curriculums in its various departments and divisions. A student in veterinary medicine may enroll either in the accelerated three-year curriculum or in the regular four-year course. The number of hours required for graduation in either case are identical. No courses will be offered during the month of August.

Michigan State College has adopted an accelerated program so that students will continue classes through the summer. Pre-veterinary and first-year veterinary classes will begin with the opening of the summer session, June 23, 1942.

New York State Veterinary College at Cornell, effective in June, 1942, will operate on a three-term basis with three 15-week terms per year. The terms will be of equal length and will contain the same courses as the work now given. The three-term system instead of the usual two will mean a 50 per cent acceleration in the course.

Ohio State University has adopted a four-quarter system so as to operate on a continuous basis. Freshmen will be admitted at the beginning of the summer quarter which starts on June 23, 1942. (See notice on page 381 re postponement of Ohio State Veterinary Conference.)

University of Pennsylvania has adopted an accelerated course of instruction. The next year's work will begin on July 27, 1942, and terminate about March 27, 1943. The following year's work will begin on April 2, 1943, and terminate the latter part of December, 1943. The length of the school year will be the same as at present: 32 to 33 weeks. There will be no change in entrance requirements.

Texas A & M College has changed its educational schedule so that the school year will be divided into three periods of 16 weeks, thereby increasing by 50 per cent the length of the instructional period each year and accelerating the course by just that much. The 1942-43 school year will begin June 1, 1942, and will end in May, 1943.

State College of Washington has made tentative plans to begin a year-round program in September, 1942. The new buildings at this school are nearing completion and the summer period will be required for dismantling laboratory and other equipment in the present quarters preparatory to moving and installation of same in new quarters. Final decision relative to exact plans for an accelerated program is therefore necessarily deferred.

The Veterinary Questionnaire

As we go to press, the AVMA office is addressing some 12,000 envelopes to be used in mailing the veterinary questionnaires prepared by the National Roster of Specialized and Scientific Personnel in collaboration with the Procurement and Assignment Service for Physicians, Dentists and Veterinarians. In addition to the enrolment blank and questionnaire, each envelope contains a covering letter and a franked envelope for return of the forms to the National Roster office in Washington.

For several weeks the circulation department of the AVMA office has spent much time in revising its address-stencil files for both member and non-member veterinarians. With the assistance of state association secretaries, livestock sanitary officials and others, an effort has been made to obtain a complete roster of veterinarians in the United States. The job has entailed much effort and considerable expense; the results are not entirely complete nor accurate, but with the help of the State Veterinary Preparedness Committees it is expected that every veterinarian will eventually receive the questionnaire and enrolment blank. Any veterinarian who does not do so within a reasonable time or who knows of any veterinarians who have been overlooked is requested to notify either the AVMA office directly or the state chairman of his Veterinary Preparedness Committee.

The form is easy to complete and it is important that every veterinarian fill his out accurately and mail it promptly. We sincerely hope that the veterinary profession will respond 100 per cent in the survey and enrolment, the purpose of which is to secure the most effective utilization and allocation of the nation's professional man power.

The Age of Veterinary Students

Data supplied by the ten recognized veterinary schools in the United States show the average age of pre-veterinary and senior students to be approximately 20 and 25 years, respectively, the exact figures being 19.6 years and 24.5 years. The lowest average pre-veterinary student reported by any school was 18.6 years; the highest, 20 years. The lowest average senior age was 23.8 years and the highest, 26 years.

These figures may be compared with those collected by the late Dr. H. E. Bemis for the report of the AVMA Committee on Education for 1931. In this report (the JOURNAL, vol. 79, No. 5, pp. 669-702), the average age of 793 freshman veterinary students at entrance into six schools was 21.45 years. Thus, it appears that first-year students today average about one year younger than those of a decade ago in spite of appreciably higher entrance requirements.

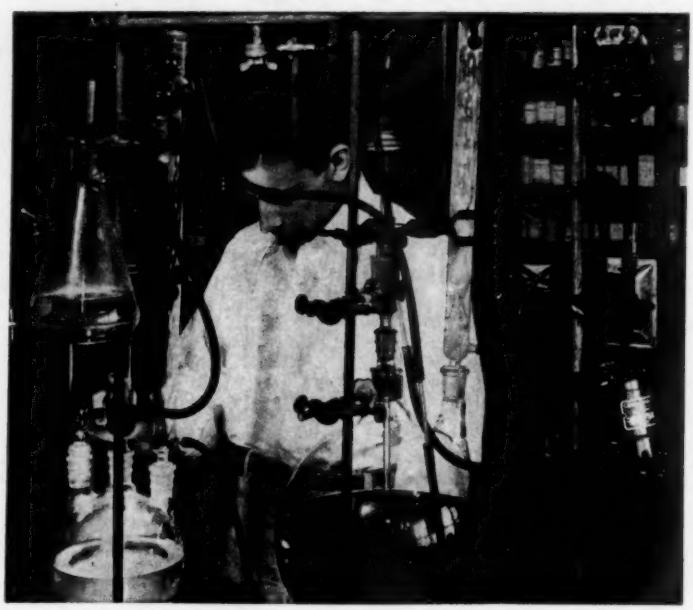
Jen-Sal

STILBESTROL SOLUTION

1 milligram is approximately equivalent to 25,000 International units of estrone
(4-4' dihydroxy-alpha-beta-diethyl stilbene = diethylstilbestrol)

A POTENT SYNTHETIC ESTROGEN
POSSESSING THE ACTION OF THE FEMALE SEX HORMONES

Indicated in dysfunctions of the genital tract due to estrogenic deficiency



Jen-Sal Stilbestrol Solution is synthesized and prepared in its entirety in our chemical laboratories, thus assuring complete control of production. Each cubic centimeter contains 1/4 milligram of the synthetic estrogen.

Stilbestrol acts on the uterus, cervix, and vagina — there is no direct action on the ovaries. This important fact eliminates the possibility of permanent damage to the ovaries such as may occur through overdoses of gonadotropic products. Stilbestrol Solution serves as replacement therapy in those cases in which there is a deficiency of ovarian hormones.

Since the original reports by Dodds et al. in 1938, extensive investigations have led to the acceptance of Stilbestrol by competent medical groups. Clinical studies on animals indicate the possible use of Jen-Sal Stilbestrol Solution—

1. To stimulate estrus in normal animals. This provides a means of regulating breeding dates.
2. To favorably influence tone of the uterus and thus aid in the evacuation of pus from the organ in cases of pyometritis in mares, cows, and bitches.
3. To overcome deficiency of the hormone in animals that would otherwise conceive, and to correct irregularities in the estrous cycle. Such irregularities are an important cause of barrenness in mares.
4. To restore sexual drive and receptivity in female animals.

DOSAGE - Sexually mature mares and cows—10 c.c. administered subcutaneously or intramuscularly. Injection may be repeated in three to seven days as indicated. For ewes and sows, the dose is 3 c.c., and for bitches, 1 c.c. (given in the same manner).

PACKAGE - **Jen-Sal Stilbestrol Solution is supplied in 10-c.c. rubber-stoppered vials at $0.60 each. Six 10-c.c. vials** **$3.50**

JENSEN-SALSBERY LABORATORIES, Inc.
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